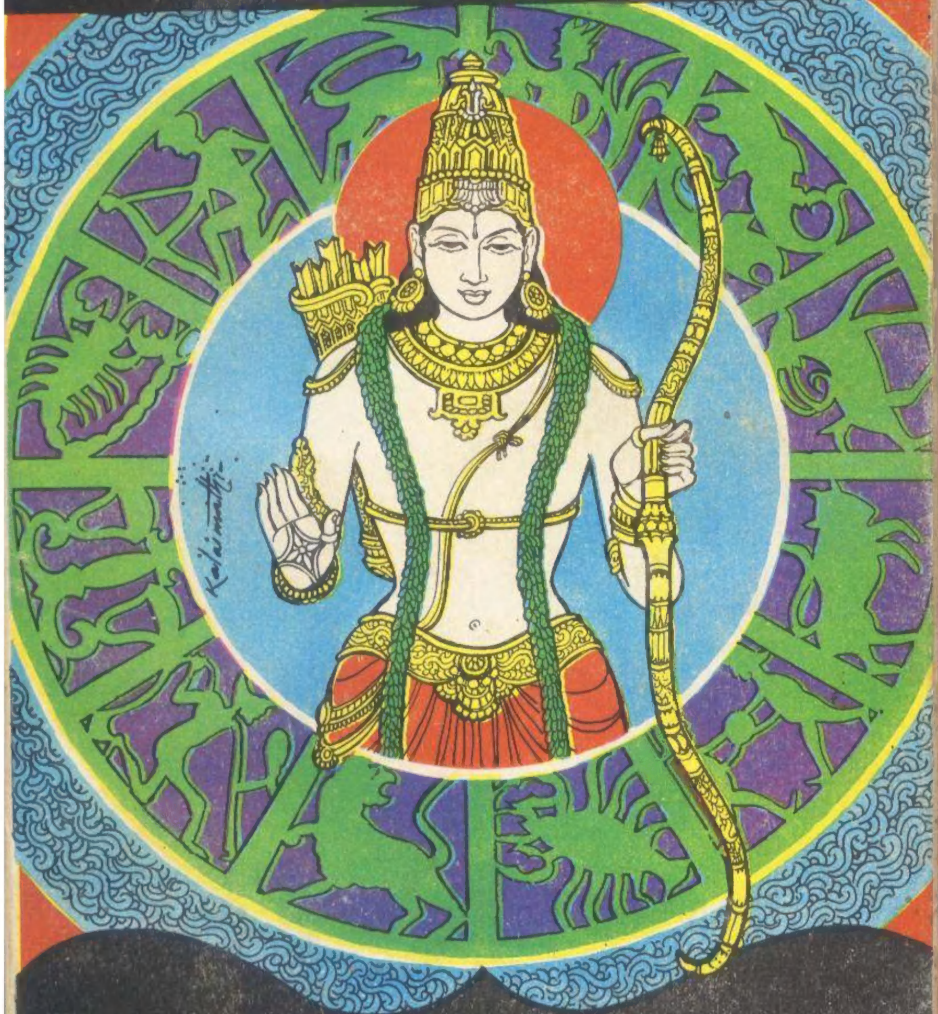


# DATE OF SRI RAMA

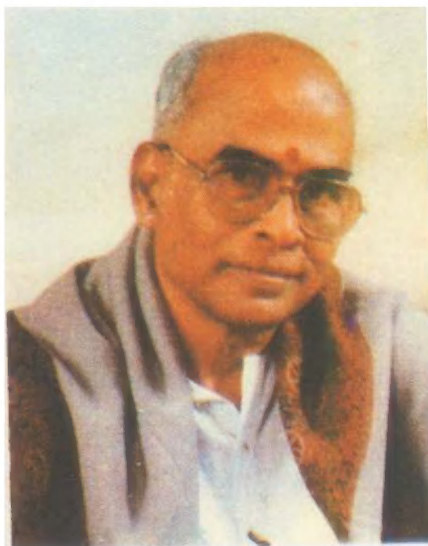
N. NARASINGA RAO



GENERAL EDITOR

**DR. N. MAHALINGAM**

## THE GENERAL EDITOR



Dr. N. Mahalingam is an eminent industrialist, educationist, technologist, planner and philanthropist of India. He is an innovative industrialist hailing from a family of traditional agriculturists and has been a pioneer in establishing agro-industries. In the realm of Sugar, Textiles, Tea and Transport his contribution to the economic development of the State of Tamil Nadu, Kerala and Karnataka is significant. A number and variety of firms were founded by him which include sugar plants, textiles, distillery, chemical units, cargo movement and synthetic gem manufacturing plant, to name a few.

Dr. Mahalingam's services in the cause of education attest to his abiding interest in making educational opportunity available to a large number of people, especially from the weaker sections. He has established the Nachimuthu Polytechnic and N.G.M.College at Pollachi to provide an educational environment conducive to the overall development of the youth. The Kumaraguru College of Technology, Sakthi Institute of Technology, Santhalinga Adigalar Tamil College, Palaniammal Higher Secondary School and Kuppanda Gounder School and a host of other Institutions owe their origin, growth and sustenance to his leadership, guidance and benevolence.

Dr. Mahalingam has been a life member of the Senate of the University of Madras and has served on the Syndicates of Madras and Anna Universities.

As a legislator and planner, Dr. Mahalingam has made significant contributions to national endeavour. As a member of the Madras Legislative Assembly from 1952 to 1967 he played a key role in bringing about a number of development projects. He has served on the Board of Directors of several public sector undertakings such as Neyveli Lignite Corporation, Cochin Shipyard Co.Ltd., Housing and Urban Development Corporation (HUDCO), Madras Metropolitan Water Supply and Sewerage Board, State Industries Promotion Corporation of Tamil Nadu (SIPCO), Tamil Nadu Industrial Investment Corporation Ltd., (TIIC) and others. He has served as Chairman of the Madras Fertilizers Ltd. He was a member of the Tamil Nadu Planning Commission during 1971-74 to draw perspective plans for industrialising the State. The Government reappointed him as a member in 1981.

Dr. Mahalingam is the author of a number of books. He is a philanthropist and an ardent devotee of Saint Ramalinga Vallalar. The Sakthi Foundation, established by him, strives to remove unemployment and hunger from its environs and bears testimony to his humane spirit.

Dr. Mahalingam is a fellow of the Institution of Engineers (India). The Bharathiar University has conferred on him the Degree of Doctor of Laws; the Anna University has awarded the Degree of Doctor of Science. He has recently been conferred the Indira Gandhi National Integration Award and the Hony. Consulship of Mauritius.

## ABOUT THE AUTHOR



Mr. N. Narasinga Rao is an Engineer by profession. After completing his technical studies in Electrical Engineering in 1939, he had served the private sector as well as the Madras Government for over a decade.

In 1955, he joined the Neyveli Lignite Corporation Limited, and after a service of over two decades, retired in 1975. He is a practising electrical

consultant since then. He has travelled throughout the country. As a faculty member, he has taken part in over fifty seminars sponsored by NIRCON. He is a specialist in conservation of energy. He has also travelled extensively in U.K., West Germany, France and a few continental countries.

He is a linguist, speaking over eight languages. He loves sports and is a tennis player. In his boyhood, he had fret-work as his hobby and in his youthful days, he switched over to photography.

After his retirement, he developed the study and research on Valmiki Ramayana. He has made a systematic analytical study of the epic and has thrown new light on facts which have so far not been referred to by others. He has proceeded step by step and fixed the Date of Birth of Sri Rama, all the time adhering to data provided in the epic. He has fixed the date as 11th February 4433 B.C.

## **ABOUT THIS BOOK**

*The Date of Sri Rama has been and continues to be under discussion. Various thinkers have given various dates. The present finding of Mr.N.Narasinga Rao is one more attempt. He follows the principle that the internal evidences made available by Valmiki in his epic are the only basic material for consideration. This is the strong foundation on which the author builds the super structure of his investigation.*

*Slokas 8,9 and 10 of Sarga 18 of the Balakanda of Valmiki Ramayana form the basic raw material for his research. These have been analysed from different angles and interpreted in a cohesive manner bringing out startling revelations. The conclusions he has arrived at relate to the birth time of Sri Rama; the balance part in Janma Lagna; Longitudes of Sun, Moon, Sukra and Sani; and the unspent part of the Guru Maha Dasa etc.*

*The search of the author for the possible years of birth of Sri Rama is comprehensive. It has extended over a wide range from 3500 B.C. As a result he has identified the year, the month and the date of birth. It is hoped that this effort will be treated by International Societies as a key reference data for connecting other events in their respective religion, countries etc.*



# **DATE OF SRI RAMA**

**N. NARASINGA RAO**

GENERAL EDITOR  
**DR. N. MAHALINGAM**

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## FOREWORD

*The date of Sri Rama has been and continues to be under discussion. Various thinkers have given various dates. The present finding of Mr. N. Narasinga Rao is one more attempt.*

*Prof. K. Srinivasaraghavan picked up the threads left loose by giant astronomers of international repute and pursued further to fix the date of birth of Sri Rama. He created a **new dimension** in the research of historic dates and developed **wonderful** methods of calculating the longitudes of planets for distant past periods and adopted them in fixing the date of birth of Sri Rama as 10th January 4439 B.C. Others in his team like Sri G.S. Sampath Iyengar, Sri G.S. Seshagiri etc., continued to do the unfinished work. Both of them are well-renowned disciples of Prof. K. Srinivasaraghavan and have contributed much to the astronomical knowledge, by way of writing several books, articles and all of them are well-received. Though they have all fixed the year of birth of Sri Rama as 4439 B.C., certain finer and confirmatory details that satisfy the sensitive principles and scientific requirements of the Hindu Astronomy, which was superior in the Treta Yuga than in the modern world, were found lacking.*

*Mr. Narasinga Rao is a practising Electrical Engineer. Though he retired from active service over a decade ago, he has taken up research on Valmiki Ramayana. He has concluded that the date of birth of Sri Rama is 11th February 4433 B.C. The year is just short of the year fixed by Prof. K. Srinivasaraghavan by six years.*

*Mr. Narasinga Rao follows the principle that the internal evidences made available by Valmiki in his epic are the only basic material for consideration; this is the strong foundation on which the super structure of the investigation is built. The basic raw material for his research are the three slokas 8, 9 and 10 of sarga 18 of the Balakanda of Valmiki Ramayana. He has studied these slokas critically and in great depth, analysed them from different angles, interpreted them in a cohesive manner, brought out startling revelations and arrived at certain conclusions to give the end-results in a convincing manner. They relate to:*



- a. Birth time of Sri Rama,
- b. Balance part in Janma Lagna,
- c. Longitudes of Lagna, Sun, Moon, Kuja, Guru, Sukra and Sani
- d. The unspent part of Guru Mahadasa etc.

*Mr. Rao has successfully developed a Hi-Tech method to embrace all the strict dogmas of astronomy and astrology. They are:*

- a. Precession of equinoxes,
- b. Sidereal and Tropical year,
- c. Lunar system of reckoning titi, month, year, etc.
- d. Luni-solar system,
- e. Fixing the equivalent western calendar years for easy link of the Indian System.

*His search for the possible years of birth is comprehensive. He has extended the search over a wide range from 3500 B.C. so as to ensure that there is no possibility of any omission. He has calculated the beginning of the solar new year day, lunar new year day, the titi on the 1st January of each year, sorted them out and has finally identified 4433 B.C. as the possible date of birth of Sri Rama.*

*Having fixed the year, Mr. Rao has proceeded to fix the month and date of birth; but he felt that this will carry conviction only when it is verified and found correct by the latest technique acceptable to all. He felt that nothing short of a direct calculation of the longitudes of these planets, as is being done now in this modern world with vast development & advancement in the technique of calculations, will be satisfactory. He is of the opinion that all disturbances that occur to the several planets due to several causes have to be taken into consideration. Hence he felt the urge to adopt modern formula. The most modern method is the one adopted by Nautical Almanac which enjoys reputation in the international community.*

*Mr. Rao adopted modern formulae and calculated the longitudes of the planets on the 11th February, 4433 B.C., and found that the results tally correct to the second with what was given by the great astronomer sage Valmiki to his posterity, as worked out by the author and given in the first chapter.*

The first discovery of the date of Birth of Sri Rama as 11th February 4433 B.C., on the strength of the internal evidence made available by Valmiki in his epic, is from the Hindu religion. This has proved to be an important and solitary land-mark in ancient history since Valmiki Ramayana is the only pre-historic epic. Hence this book is bound to be received as a great boon by the inquisitive and impatient indologists, who have been starving all along for such authoritative data acceptable to the international community.

The International Society for the Investigation of Ancient Civilizations has been resolutely looking forward for the result of investigations into the date of the Ramayana. This institution, of which the undersigned is the Chairman, welcomes this effort and recommends to the International Societies to treat this as the key reference data for connecting other events in their respective religions, countries etc., as pre-Rama and post-Rama periods.

In this work the author has set at rest the controversy of the Ayanamsa. Even this day, the Ayanamsa has been defying a satisfactory solution. Different stalwarts of astronomy and astrology adopt different values because there was no known way of verifying their values. The longitudes of a few planets given by Valmiki as internal evidences in his epic, form important and weighty references in Nirayana. The longitudes in Sayana are calculated by a modern method. The difference between the above two, gives the value of Ayanamsa. This value tallies very well with the value calculated as per the "Surya Siddhanta" propounded by Sri L. Narayana Rao.

A Diary of Sri Rama has been prepared by the author purely on the internal evidences made available by Valmiki himself under his own authority. Nothing has been assumed by the author out of imagination or intellectual speculation. All such evidences have been sorted out and arranged in a chronological order. In this exercise, a vivid picture of Sri Rama, from his birth till his coronation as the King of Ayodhya, has emerged.

I hope this book will be warmly received by the academicians and scholars as well as the lay public.

Madras  
June 1990.

N. Mahalingam



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## INTRODUCTION

A SURPRISE, if not a wonder, it may be, to the reader that an electrical engineer by profession could venture to write a treatise on SRI RAMA'S JATAKA. It all happened this way. On a fine morning the parayana of Valmiki Ramayana was initiated to the writer by Sri Kalyanarama Battacharya, the principal sishya of late Sri Anantarama Dikshitar, as part of the religious ritual. When the parayana from the Bala Kanda to the end of Yudha Kanda was repeated a few times, the writer was much attracted towards the treasure of knowledge of many disciplines like science, engineering, etc., found hidden in the great epic. It looked as though that all modern and latest discoveries and technological advancements in medicine, science and other disciplines are all made to prove that all these that existed in the Ramayanic age, as mentioned by Valmiki, are true. An initial desire to dig out this treasure led to an impulse to study it in depth. He then took it as a favourite pastime in all his leisure hours, to study the epic methodically, minutely, analytically, critically, etc. But a few passages, which refer to the astrological aspects, could not be well followed for want of a complete horoscope of Sri Rama. A serious search was made. Nothing suitable for the purpose was available except one Rasi Kundali which states that Chandra is in Karkataka sign, which is the Lagna and all other planets except Budha, Rahu and Ketu are in their exalted signs. This is an incomplete piece of data for an astrologer for an in-depth study of the epic. For example the sesha in Guru Maha Dasa, which is the corner stone for the predictive astrology is missing. So the writer has no other way except to fall back upon the very words of Valmiki. The writer has such a strong and unshakable faith in Valmiki that he should have given in his slokas all the details required for posterity to study the epic critically from the astrological points of view also.

With this strong faith, the writer made an attempt to study deeply and analyse the following slokas in search of the missing details. In this analysis, what is attempted is not just a literal translation in whatever language and however linguistically correct it may be, but



a reasonable, intelligible and acceptable interpretation, without intellectual speculation.

ततो यज्ञे समाप्ते तु ऋतूनां षट् समत्ययुः ।  
 ततश्च द्वादशे मासे चैत्रे नावमिके तिथौ ॥ ८ ॥  
 नक्षत्रे ऽ दितिदैवत्ये स्वोच्चसंस्थेषु पञ्चसु ।  
 ग्रहेषु कर्कटे लग्ने वाक्पताविन्दुना सह ॥ ९ ॥  
 प्रोद्यमाने जगन्नाथं सर्वलोकनमस्कृतम् ।  
 कौसल्याजनयद्रामं सर्वलक्षणसंयुतम् ॥ १० ॥

Bala Kanda, Sarga 18.

These are the slokas which have been subjected to much torture by many commentators in remote and recent past, many of them in a parrot-like fashion have stated that five planets are in their exalted signs. The writer does not pretend to be a scholar, in Sanskrit or astrology. With moderate knowledge in both, with all the views in the background and with great devotion and invocation to Sri Rama and Ishta Devata, the writer plunged into the investigation of these slokas. Over a month long exercise and the consequent chanting of the magic name of Sri Lord Rama proved to be the simple recipe to achieve results quite satisfactory to the writer. The writer now desires to share the results with his readers, only with the prime view to disseminate information.

## CHAPTER I

### PROSE ORDER OF SLOKAS 8, 9, & 10, SARGA 18, BALA KANDA

ततः यज्ञे समाप्ते तु ऋतूनां षट् समत्ययु.  
ततः द्वादशे मासे, चैत्रे नावमिके तिथौ च  
अदितिदैवत्ये नक्षत्रे पञ्चसु ग्रहेषु स्वोच्च  
संस्थेषु लग्ने वाक्पतौ इन्दुना सह  
कर्कटे प्रोद्यमाने सर्वलोकनमस्कृतं  
सर्वलक्षणसंयुतं रामं कौसल्या अजनयत् ॥

"In the meantime, after sacrifice was over, six seasons (each consisting of two months from Vasanta Rutu) rolled away one after another. Then at the twelfth month (after sacrifice was over) in the month of Chaitra, on the ninth lunar day (of the bright fortnight) when the asterism Punarvasu (presided by Aditi) was in the ascendant, when (as many as) five planets viz. Ravi, Chandra, Kuja, Sukra and Sani happened to be in one's own house or in exalted positions (just rose or raised in the zodiacal signs of Aries (Mesha) Cancer (Karkataka), Capricorn (Makara) Pisces (Meena) or Libra (Tula) and when Janma Lagna and Guru in conjunction with Chandra were just rising i.e., entering together simultaneously the zodiacal sign Karkataka i.e., Cancer, Kausalya (the eldest wife of Dasaratha) gave birth to Sri Rama, who is the Lord of the Universe and who is endowed with all auspicious divine marks."

#### VERIFICATION OF INPUT SLOKAS:

Slokas 8, 9 & 10 of Sarga 18 of Bala Kanda of Valmiki Ramayana serve as the main and only input for the discovery of the birth details of Sri Rama. These slokas are similar to any raw material required for any project. Before study, it is to be vouchsafed that these slokas are not spurious. The following is a fairly exhaustive check list for the verification.

## CHECK LIST

|   |      |
|---|------|
| Whether the slokas are in Anushtub Chandas:   | Yes. |
| Whether each sloka contains two equal verses:   | Yes. |
| Whether each verse has two equal quarters:  | Yes. |
| Whether each quarter has eight syllables:   | Yes. |
| Whether the fifth syllable in the first quarter is short:   | Yes. |
| Whether the same words are found in the other versions, like Northern, Southern, Bombay edition, etc: | Yes. |
| Whether any controversy in the construction of these slokas has come to light:                        | No.  |
| Whether the words in the slokas are simple, which is unique with Valmiki:                             | Yes. |
| Whether these slokas can be taken as genuine:   | Yes. |

ततः यज्ञे समाप्ते तु ऋतूनां षट् समत्ययुः

"then after the completion of the Yagna (sacrifice) six Rutus (seasons) rolled away".

At the very first glance, it may appear that one full year consisting of six seasons rolled away. But it should not be and is not so. The Putrakameshti performed by Dasaratha commenced in the Vasanta Rutu and in the month of Chaitra. It concluded in the next month of Vaishaka. i.e., in the same Vasanta Rutu. Six Rutus including this Vasanta Rutu rolled one after another. Though six Rutus rolled, yet it is not a full year. The last Rutu passed was Sisira. The events to follow will naturally be in the beginning of the next cycle i.e., Vasanta Rutu.

द्वादशे मासे चैत्रे

"at the twelfth month and during the month of Chaitra"

Thus Valmiki has clarified the following points clearly.

- (a) It is the twelfth month after Putrakameshti was completed;
- (b) It is in the month of Chaitra.

द्वादशे मासे

"during the twelfth month":

The very construction of the words that is "at the twelfth month" indicates that one full year of twelve months did not pass. In fact only ten months and a few days have passed since the conclusion of the Yagna. This confirms that the Putrakameshti which commenced in Chaitra concluded in the next month Vaishaka. A reference to the PERT CHART (Annexure 1) would show the various activities of the Yagna from its commencement to its conclusion. Thus the twelfth month from Vaishaka is the month Chaitra, under reference now.



Now let us examine the month Chaitra. The very emphatic mention of Chaitra should automatically eliminate any doubt about the month in which Sri Rama is born. None can assume any authority to investigate whether the birth could have taken place in any other month like Palguna.

Regarding the month Chaitra, there are two systems of reckoning in the present days. They are Chandramana and Sauryamana systems.

#### **Chandramana System:**

As per Chandramana system, the New Year starts after the Amavasya at the end of Palguna month. Valmiki has made it clear that the titi of Sri Rama is Navami. This means that eight titis have passed after the New Moon i.e., Amavasya. So Sri Rama is born in the month of Chaitra as per the Chandramana system.

#### **Sauryamana or solar system:**

There is a claim now that Surya Sidhanta, is the best known system in the present days. It is believed to have been current in the present form from the eleventh century A.D. only. Is this so? Let us see what Valmiki says about this

The Hindu solar year begins with the Sun's entry into Aries i.e., Mesha. This was happening in February of every year till the 15th century B.C. and in March till the 18th century A.D. But owing to greater length of the Hindu year, the first day of the solar year now falls on the 12th or 13th April of every year.

Again by Surya Sidhanta the poet has given the longitude of Sun as  $9.0^\circ$  at the time of Sri Rama's Birth. (See elsewhere for details).

Taking a day for a degree, eight full days have already lapsed after the entry of Sun in Aries i.e., Mesha, which is Chaitra month. Thus the month Chaitra mentioned by Valmiki is the month by both Chandramana and Sauryamana systems.

#### **Twelfth month:**

Regarding the twelfth month there appears to be a certain contention. In short the contention is this. "Putrakameshti ended in Chaitra month. After the payasam was taken by the queens of

Dasaratha, the births at the twelfth month i.e., Chaitra, look unusual because the period of development of a baby is usually ten months."

Now let us look into this aspect a little closer. First of all, Putrakameshti ended in Vaishaka though it started in Chaitra. At the almost fag end of the Yagna in Vaishaka, the Payasam handed over by Prajapatya Nara, was given to the wives of Dasaratha. Valmiki states in 1.16.30 that the conception took place not long after this 'Achirena' अचिरेण . Thus some time lapse between the administration of payasam and the conception is indicated by the poet. This period of time gap could as well be arrived at by a simple back calculation from the time of Sri Rama's Janana which took place at the twelfth month reckoned from Vaishaka i.e., at Chaitra month, Navami titi. So ten full months and a few days had elapsed after the administration of the payasam to the queens. Leaving about ten months for the normal period of the development of the child, only a few days are found in excess. These are the days referred to by the poet, by the word 'Achirena' अचिरेण i.e., shortly. A reference to the activities, 34-35, 35-36, 36-37 would show that this period is less than 23 days plus - b plus c. This is a normal way of giving birth.

नावमिके तिथौ "during the titi of Navami"

This is obviously in Sukla Paksha, as confirmed by the position of the Sun which is at 9.0° in its exalted position. Valmiki has categorically said that the titi in which Sri Rama is born is Sukla Navami. Nobody has the authority to tamper with it by any kind of word twisting. From time immemorial, Hindus have adopted this and are celebrating Sri Rama Navami festival on this titi alone. Yet there appears to be a kind of controversy on a particular aspect in some quarters.

"A contention is that Mesha Sukla Navami and Punarvasu nakshatra cannot come together. From the beginning of Mesha rasi to the end of Punarvasu it is 93° 20'. The interval of eight titis between the Sun & Moon is 8.0° × 12° which is 96.0°. Therefore, Sukla Navami should ordinarily begin at 96.0°.

No doubt, this is true ordinarily; but a close investigation of details may, however, disclose the weak points in such a straight and simple

calculation. Anyhow, before getting into any detailed mathematical calculations, let us take advantage of the ephemeris to search for any reliable evidence for the possibilities of Mesha Sukla Navami and Punarvasu nakshatra occurring on the same day. Suffice it, it is believed, to place before the readers the following planetary positions found in and extracted from "Raman's ninety year Ephemeris of Planetary Positions" (1891-1900 A.D.) by B.V. Raman and leave it to the readers to judge.

The following sayana longitudes of the planets are for 5.30 A.M., I.S.T., for the year 1953.

The Ayanamsa is given as  $21^{\circ} 45' 18''$ .

|  |                   |
|--|-------------------|
| Sun's position on 15.4.1953 in Sayana    | $25^{\circ} 14'$  |
| Sun's position on 25.4.1953 in Sayana    | $34^{\circ} 59'$  |
| So Sun's position on 20.4.1953 in Sayana | $30^{\circ} 06'$  |
| Less Ayanamsa $21^{\circ} 45'$           | $8^{\circ} 21'$   |
| Sun's Nirayana longitude on 20.4.1953    | $8^{\circ} 21'$   |
| Moon's position on 19.4.1953 in Sayana   | $101^{\circ} 46'$ |
| Moon's position on 21.4.1953 in Sayana   | $126^{\circ} 19'$ |
| Moon's position on 20.4.1953 in sayana   | $113^{\circ} 52'$ |
| Less Ayanamsa $21^{\circ} 45'$           | $92^{\circ} 17'$  |
| Moon's Nirayana longitude on 20.4.1953   | $92^{\circ} 17'$  |

The Nirayana longitude of the Sun is  $8^{\circ} 21'$  and can occur only after 8 days from the solar new year. The Nirayana longitude of Moon is  $92^{\circ} 17'$  and this fixes the nakshatra as Punarvasu. Thus it is seen that Mesha Sukla Navami and Punarvasu occurred on the same day on the 20th April, 1953 at 5.30 P.M. as per a modern ephemeris.

Now let us have a look into the conventional and traditional method adopted for reckoning of time which is the simplest and which may be understood and followed by any one. The system of reckoning the titi and nakshatras by Ghatikas and Vighatikas (Naligais and Vinadis in the south) in the Hindu and especially the vakya sidanta almanacs is very ancient and is followed even today. The duration is divided into a number of Ghatikas and Vighatikas or Naligais and Vinadis or Hindu hours of about 24 hours. A normal titi extends over 0.9483 of a day, while a mean nakshatra extends over 1.01191 days.

The solar and lunar anomalies etc., may make a 'titi or nakshatra longer or shorter. A reference to any almanac especially that of a Vakya Sidanta would reveal that the duration of nakshatras may vary from 52 to 68 ghatikas or naligais ordinarily. At times the limit goes beyond 68 ghatikas also. A titi or nakshatra may commence at any time of the day or night. This is normal. Now let us examine the period of nakshatra whose duration is 70 ghatikas, which is just 2 ghatikas over 68 ghatikas.

The mean progress in a day

$$= 13^{\circ} 20' \times \frac{60}{70} \text{ i.e., } \frac{40}{3} \times \frac{60}{70} = 11^{\circ}.4$$

Now let us consider a case when Amavasya (New Moon) occurred at 6 a.m. when Sun and Moon were  $0^{\circ}$  in Mesha and at the beginning of Aswini. Then when the Sun moves at its average rate of  $1^{\circ}$  per day, the Moon would move as given below.

At the end of Sun's  $1^{\circ}$  Moon will be at the end of  $11^{\circ}.4$

|      |             |      |                |
|------|-------------|------|----------------|
| -do- | $2^{\circ}$ | -do- | $22^{\circ}.8$ |
| -do- | $3^{\circ}$ | -do- | $34^{\circ}.2$ |
| -do- | $4^{\circ}$ | -do- | $45^{\circ}.6$ |
| -do- | $5^{\circ}$ | -do- | $57^{\circ}.0$ |
| -do- | $6^{\circ}$ | -do- | $68^{\circ}.4$ |
| -do- | $7^{\circ}$ | -do- | $79^{\circ}.8$ |
| -do- | $8^{\circ}$ | -do- | $91^{\circ}.2$ |

The extent of the segment of Punarvasu is from  $80^{\circ}.00$  to  $93^{\circ} 20'$ . So Sukla Navami titi and Punarvasu can occur together.

A second case:

Now let us consider a second case. Since Mesha Sukla Pratama begins when the New Moon ends in the range  $345^{\circ}$  to  $15^{\circ}$ , let us consider the case when Amavasya occurred at the nakshatra Revati  $350^{\circ}$  i.e.,  $10^{\circ}$  before Aswini and the average duration of a nakshatra is 64 ghatikas.

$$\text{Then the Moon moves in a day by } \frac{40}{3} \times \frac{60}{64} = 12^{\circ}.5$$



Then the Sun and Moon move as shown below.

|                     |    |                         |        |
|---------------------|----|-------------------------|--------|
| At the end of Sun's | 1° | Moon will be at the end | 2° .5  |
| -do-                | 2° | -do-                    | 15° .0 |
| -do-                | 3° | -do-                    | 27° .5 |
| -do-                | 4° | -do-                    | 40° .0 |
| -do-                | 5° | -do-                    | 52° .5 |
| -do-                | 6° | -do-                    | 65° .0 |
| -do-                | 7° | -do-                    | 77° .5 |
| -do-                | 8° | -do-                    | 90° .0 |

In this case also Sukla Navami and Punarvasu nakshatra occurred on the 9th day from Amavasya.

Thus it is very clear that there is every possibility of Sukla Navami and Punarvasu nakshatra to occur on the same day.

This should set at rest any contention.

अदितिदैवत्ये नक्षत्रे

"in the Punarvasu nakshatra".

The clue is found in the vedic Legend that Aditi was the mother of Gods and all vedic Gods are always linked with stars by Valmiki. Thus Aditi is linked with Punarvasu (POLLUX in European system)

Next let us look into the phrase

लग्ने वाक्यतौ इन्दुना सह कर्कटे प्रोद्यमाने

"when Janma Lagna and Guru together with Chandra had just risen in Karkataka sign".

Fixing the time of birth of Sri Rama:

Poet Valmiki has not given the time of birth of Sri Rama directly. The time of birth is very necessary to fix the beginning longitude of Janma Lagna. No doubt, the poet has stated that the Janma Lagna of Sri Rama is Cancer i.e., Karkataka. There is no difficulty in everyone accepting this; but the sesha in Janma Lagna is required for several purposes. Karkataka lagna spreads from 14 ghatikas, 19 vighatikas to 20 ghatikas 7 vighatikas i.e., about 2 hours and 19 minutes. In 2 hours 19 minutes, Moon can progress from 90° to 91° 10', since the movement of Moon is about 33 minutes per hour.

So the Birth of Sri Rama should have taken place only between  $90^{\circ}$  to  $91^{\circ} 10'$ , in Karkataka sign.

Valmiki in his phrase

लगने वाक्पतौ इन्दुना सह कर्कटे प्रोद्यमाने

has categorically stated that when Kausalya gave birth to Sri Rama, the Janma Lagna and Guru together with Moon just rose in Karkataka sign i.e., just entered the sign together simultaneously. By this Valmiki has disclosed the actual longitude of Janma Lagna, Chandra and Guru, correct to the second. If we assume  $1''$  as the minimum, the longitude of Janma Lagna, Chandra and Guru should be  $90^{\circ} 00' 01''$ . Obviously this is in Nirayana system. The vexed question of ayanamsa does not come in. Thus what is given by the poet is eternal for any period to come. Here we have to marvel at the use of the key word 'PRODYAMANE' as it unlocks the lid to expose the treasure stored in the form of valuable data required by posterity of Valmiki. The word 'PRODYAMANE' प्रोद्यमाने conveys the meaning as just rising. 'Rising' and in Hindi उदय होता हुआ is the meaning given in the Sanskrit-Hindi-English dictionary by Surya Kanta, published by M/s Orient Longman. This is the only proper and correct way of interpreting the meaning of this simple word. On the other hand, interpreting it in any other way would prove to be a case of word twisting or reading too much between the lines.

#### Calculation of Janma Lagna:

A simple and age long practice of calculating the Janma Lagna is by the method of Ghatikas and Vighatikas. The average duration of 60 ghatikas per day is distributed in all the twelve signs from Mēsha to Meena. They are not equal in each sign. They vary according to the latitude. Sri Rama is born in Ayodhya. The latitude of Ayodhya is  $26^{\circ} 48'$  (North). For this latitude the rasimana is given in Annexure 3. These figures are taken from a sudha dhrik panchangam. According to these, the following is the calculation for finding out the birth time of Sri Rama.

| Sign     | Duration |            |
|----------|----------|------------|
|          | Ghatikas | Vighatikas |
| Mesha    | 2        | 40         |
| Vrishaba | 4        | 47         |
| Mithuna  | 5        | 32         |
| Total    | 12       | 59         |

Thus Mithuna sign extends up to 12 ghatikas and 59 vighatikas. When we add the minimum of one vighatika to this, it just falls in Karkataka sign.

So the birth Time of Sri Rama is 13 Ghatikas, from the sunrise on that day.

13 ghatikas are equivalent to 5 hours 12 minutes.

If we add this to the local mean time (L.M.T.) of sun rise, we will get the birth Time of Sri Rama in L.M.T.

#### Analysis of the Phrase

स्वोच्च संस्थेषु पञ्चसु ग्रहेषु

"when five planets just rose in one's own house or rose to approach near their most exalted positions".

This is how poet Valmiki has employed just four or five words forming a simple declarative phrase to convey the positions of five planets in the horoscope of Sri Rama. As we all are already familiar with, it is the custom of Valmiki to be brief and employ shorter forms for metrical purposes. The words used also are simple. Sometimes due to over simplification the reader is misdirected. Here is such an instance. Almost all great and eminent commentators like Ramanujeuja, Govinda Rajeeva etc., have interpreted the expression to mean that five planets are in exaltation. Once started and embodied in the commentary, the concept perhaps gained an easy and rapid currency amongst other scholars also and almost all of them naturally felt bound as camp followers to shape their views accordingly. In this

interpretation except that five planets are in exalted positions, no additional information or clue is made available, like

the time of birth,  
the sesha in Janma Lagna,  
the sesha in Guru mahadasa,  
the longitudes of the planets etc.

Notwithstanding the high authority of these esteemed commentators and with great reverence and salutations to them, let us pause for a while and indulge in an in-depth study of the expression in search of some more data or information, apart from the fact that a few planets are in their exalted signs.

If the intention of the poet was only to convey that certain planets were in their exalted signs, he could have said so using the word UCHA alone. There would have been no need or necessity to use another word 'SVA' compounded with it. Definitely Valmiki would not have used any word unnecessarily or redundantly. No doubt at all, that Valmiki should have been very well versed in the science of astrology also. Though Valmiki was not writing a text book on Sri Rama's horoscope, it is in the fitness of things to expect that he might have packed a few or lot of astrological information and data necessary for studying and comparing the horoscope of Sri Rama, in his chosen words or phrases. Thus the poet gives ample scope for creativity thinking without exaggerating or modifying the meaning or importance of the words or diluting their essence. Any inference or interpretation should be only without any violation and within the parameters or the four corners of the fundamentals and facts recorded by Valmiki in his epic. They are as follows:

1. Chaitra is the month in which Sri Rama is born.
2. Navami is the titi in which Sri Rama is born.
3. Punarvasu is the Janma nakshatra of Sri Rama.
4. Karkataka is the Janma Lagna of Sri Rama.

#### **Svocha Samstheshu Panchasu Graheshu**

If we analyse this expression, it will be seen that there are five distinct words. They are

Sva  
 ucha  
 samstheshu  
 panchasu  
 graheshu.

The relevant dictionary meanings of these words are,

|            |    |  |
|------------|----|--|
| Sva        | .. | one's own  |
| ucha       | .. | the apex of the orbit of a planet<br>(here 'orbit' means the path of<br>the heavenly body) |
| samstheshu | .. | to come or stay near   |
| panchasu   | .. | five   |
| graheshu   | .. | planets  |

The poet indicates two distinct conditions. They are

Sva samstha            स्व संस्थ            and    उच्च संस्थ  
 ucha samstha.

'sva samstha' means 'coming and staying in one's own sign'. 'ucha samstha' means 'when the transit of the planet comes near and stays for a while in its apex i.e., parama ucha position'. Let us further indulge in the critical analysis of the phrase 'ucha samstha'

If Valmiki means, by 'ucha samstheshu', that the planets are in their signs in which they have their ucha position, the application of the word 'samstha' is not appropriate. The dictionary meaning of the word 'samstha' is 'to come and stay near'. In the case of a sign wherein a planet has already moved, it does not carry any sense that the respective planet is coming near to stay in that sign. Instead if a planet is already in a particular sign in which the particular planet has its exalted position, then there is meaning that it moves to go near the exalted position.

The dictionary meaning of the word 'ucha' is the 'apex of the orbit of a planet'. The apex means the summit or the culminating point which is the parama ucha position or exalted position. Orbit means 'the path in which heavenly body transits'. 'Samstha' means 'to come and stay near'. So the expression 'ucha samstha' conveys the meaning that 'when the transit of the planet comes near and stays in its apex i.e., parama ucha point'.

### Investigation:

This could mean that one planet had just risen in its own sign and four planets had just risen to their own near deep exalted positions together, at the same moment. This also could mean that two, three or four planets could have risen in their own signs and the rest had just risen to their own deep exalted positions. But in the later case, a serious difficulty creeps in, in fixing the own sign of the planets Kuja, Budha, Guru, Sukra and Sani since they all possess two houses of their own (Svakshetra). Certainly the poet would not have given such a wide scope for misjudgement. Instead, if the planet in its own sign were either Sun or Moon, this difficulty does not arise. The poet has already stated that the planet Sun is in Mesha sign, which is not its own sign. So evidently he should have meant Moon alone and it is in its own sign i.e., Karkataka.

Now part of our interest is in locating the four planets in ucha positions.

### Analysis of the word 'ucha':

Stanza 13 of Brihat Jataka of Varaha Mihira says thus:

'Mesha, Vrishaba, Makara, Kanya, Kataka, Meena and Tula are the exalted signs of seven planets respectively from the Sun onwards. The highest exaltation counting from the Sun are 10th, the 3rd, the 28th, the 15th, the 5th, the 27th and the 20th degrees of the several signs in their respective order. The Sun is exalted in Mesha but its parama ucha position will be in 10th degree'

Here one point requires repetition. As we have discussed earlier, parama ucha position is the most powerful position of a planet to occupy. Whenever Valmiki uses the word ucha he should have meant parama ucha position only. This means that when the Sun occupies its parama ucha position i.e., the 10th degree in Mesha sign, it gives the planet one full RUPA or 60 sashtiamsas, which is the full or 100% strength of ucha bala. Or again if a planet occupies  $1^{\circ} 30'$  on either side of its parama ucha position i.e., between  $8^{\circ} 30'$  and  $11^{\circ} 30'$  in the case of Sun, then also it will have one full RUPA or 60 sashtiamsas. So is the case with the other planets also. In this background, let us now investigate the conditions of all the planets with regard to their actual positions in detail and in depth as indicated by Valmiki.

**Sun:**

This is in parama ucha position, but at  $9^\circ$  which also gives the Sun one full Rupa i.e., 60 sashtiamsas. The position of the Sun as  $9^\circ.0$  is clarified by Valmiki, when he refers to the births of Sri Lakshmana and Sri Satrugna, in the later stanzas. He says that the Sun raised to its parama ucha position in his expression 'ABYUDITE RAVAU' अभ्युदिते खौ i.e.,  $10^\circ$  at the time of their births. These births took place just over 24 hours later than that of Sri Rama. Sun travels about 1 degree per day. So we can safely fix the longitude of Sun as  $9^\circ.0$ . No doubt, we can also fix it as  $10^\circ.0$ , if we can consider that the births of Sri Lakshmana and Sri Satrugna had occurred between  $11^\circ$  and  $11^\circ 30'$  which is also the same as parama ucha position. But the position of the Sun shifts to  $10^\circ.0$  at the time of the birth of Sri Rama. This means that the titi also shifts to dasami from navami. This is against what Valmiki has stated. So this fixes the longitude of the Sun as  $9^\circ.0$

**Moon:**

Valmiki has made it very clear by his employment of the word 'PRODYAMANA' that the Udaya Lagna and Jupiter together with Moon had just risen or entered the sign Karkataka i.e., the gate of Karkataka together at the same instant. This automatically fixes the sign of Moon as Karkataka, which is its own sign (Swakshetra).

This kind of entry into the Karkataka at the same moment is an exceptionally rare phenomena. This goes to justify the Divinity of Sri. Rama. So the Moon is in  $90^\circ 00' 01''$ , in his own house at the fourth pada.

**Mars:**

He could be taken as a planet raised to his own deepest exalted position of  $298^\circ$  in Makara sign.

**Budha: (Mercury)**

Budha is generally near the Sun. At the best it can be away from the Sun by  $28^\circ$  only. When the Sun is in its exalted position i.e., in



Mesha, Budha cannot be in its exalted position in Kanya. So Budha having been considered for its ucha position by Valmiki is ruled out.

**Guru: (Jupiter)**

No doubt, Guru is in his exalted sign i.e., Karkataka. Since he was at the same degree as that of Moon when he along with Moon just entered Karkataka, its longitude also automatically gets fixed as  $90^{\circ} 00' 01''$ . If Guru were to be considered for its exalted position of  $95^{\circ} 0'$ , it can happen only if it is between  $93^{\circ} 30'$  and  $96^{\circ} 30'$ . In that case, the longitude of Moon also gets shifted to the same degrees, since Guru and Moon are to attain that position simultaneously. This will then mean that the Moon would have been in Pushya nakshatra. This is contradictory to what the poet has categorically stated. So the longitude of Guru gets fixed as  $90^{\circ} 00' 01''$ . This is not his parama ucha position to give him one full Rupa. So Valmiki could not have considered Guru for his ucha position.

**Sukra: (Venus)**

Like Budha, Sukra also should be near the Sun. Since the Sun is in Mesha, Sukra can be in Meena. The parama ucha position of Sukra is  $357^{\circ}.0$ . So we can fix the longitude of Sukra as  $357^{\circ}.0$ . Thus Sukra is another planet considered by Valmiki as the one in ucha position.

**Saturn:**

Saturn is the fourth planet to be considered as the planet which was in the ucha position. Its parama ucha position is  $200^{\circ}.0$ . Thus the longitude of Saturn gets fixed as  $200^{\circ}.0$

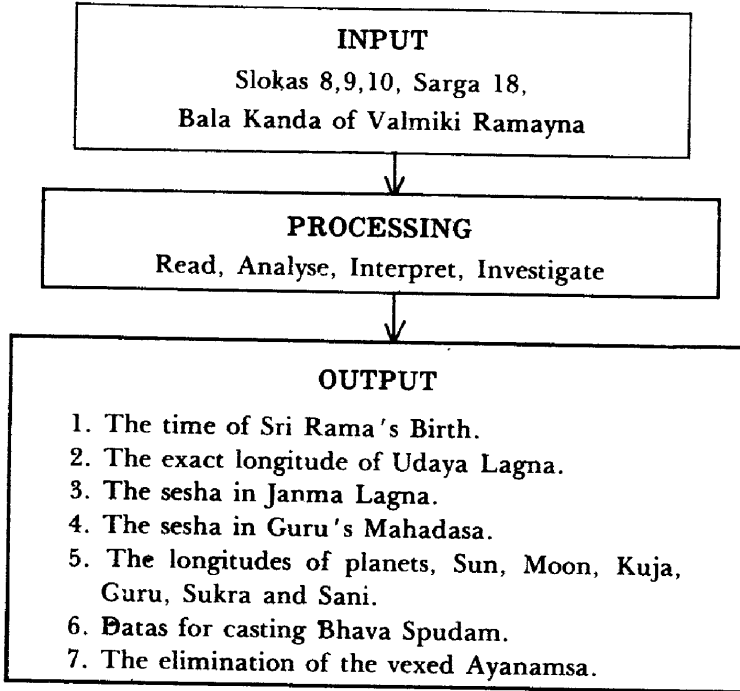
**Rahu & Ketu:**

Just as Varaha Mihira has omitted reference to Rahu and Ketu, Valmiki also has omitted reference to them.

**Summary**

In summing up, the in-depth study and critical investigation of the expression 'SVOCHA SAMSTHESHU PANCHASU GRAHESHU' reveal that the Moon is in his own house i.e., Karkataka and the four planets, Sun, Kuja, Sukra and Sani are in their deep exalted positions, in Mesha, Makara, Meena and Tula respectively.

## FLOW CHART FOR DISCOVERY OF SRI RAMA'S BIRTH DETAILS:



Thus their longitudes also get fixed as here under:

|       |             |
|-------|-------------|
| Sun.  | 9° 0        |
| Moon  | 90° 00' 01" |
| Kuja  | 298° 00     |
| Guru  | 90° 00' 01" |
| Sukra | 357° 00     |
| Sani  | 200° 00     |

By the above investigation and interpretation, the following important information and data are automatically made available as by-products.

1. The time of Birth of Sri Rama.
2. The exact longitude of Udaya Lagna.

3. The sesha in Janma Lagna.
4. The sesha in the Mahadasa of Guru.
5. The longitudes of six planets correct to the second.
6. Details for the Bhava Spudam.
7. The elimination of the vexed question of ayanamsa.

Yet the following details are found wanting.

1. The year of Birth of Sri Rama.
2. The longitudes of Bhuda, Rahu and Ketu.
3. The week day.

Having fixed the longitudes of the six planets viz. Ravi, Chandra, Kuja, Guru, Sukra and Sani, we can with some efforts calculate the longitude of the rest of the planets viz., Bhuda, Rahu and Ketu, if we can succeed in finding out the year and date of birth of Sri Rama. So our next major task is to find out the year and date of Sri Rama's birth, a task not so easy to perform due to the Herculean efforts involving a lot of astronomical and mathematical calculations for a remote past.



*The vilest among men in this world is he who having pledged his word to grant the desire of suppliants who are themselves endowed with strength etc., and have also rendered good offices to him in the past, fails to implement his promise.*

*Bala Kanda - 4 - Canto 30 - Verse 71*



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## CHAPTER II.

### SEARCH OF SRI RAMA'S BIRTH YEAR, MONTH AND DATE:

#### II. Description of Tables II. 1; II. 2; & II. 3.

We all know and everybody agrees that Sri Rama's Avatar was earlier than that of Sri Krishna. Sri Krishna was born in 3200 B.C. So there is no purpose in searching for the date of Sri Rama's birth between 1 B.C. to 3200 B.C. Further the Ikshavaku dynasty terminated in Kali Yuga. (vide. Skanda 9, Adyaya 12, Sloka 16 of Srimad Bhagavat). There were 59 kings who ruled after Sri Rama. The names of these kings are as follows.

#### Kosalas.

|                  |                                  |
|------------------|----------------------------------|
| 1. Sri Rama      | These are the kings who ruled    |
| 2. Kusa          | till Sri Suka narrated to        |
| 3. Athithi       | Parikshit.                       |
| 4. Nishada       | Sri Suka further narrates the    |
| 5. Nabha         | future kings who would rule till |
| 6. Pundarika     | Kali Yuga. They are              |
| 7. Kshemadanvan  | 25. Mahaswan                     |
| 8. Devanika      | 26. Viswahaswa                   |
| 9. Aneeha        | 27. Prasenajit                   |
| 10. Pariyatra    | 28. Takshaka                     |
| 11. Balasthala   | 29. Brihatbala                   |
| 12. Vajranabha   | 30. Bruhadranan                  |
| 13. Kagana       | 31. Urukriyan                    |
| 14. Vidhruti     | 32. Vatsabridhan                 |
| 15. Hiranyanabha | 33. Prithividman                 |
| 16. Pushya       | 34. Banu                         |
| 17. Dhruvasandhi | 35. Divakanu                     |
| 18. Sudharsan    | 36. Sahadevan                    |
| 19. Agnivarna    | 37. Brihadasva                   |
| 20. Sighra       | 38. Banuman                      |
| 21. Maru         | 39. Prathikasva                  |
| 22. Prasusrutha  | 40. Suprathika                   |
| 23. Sandhi       | 41. Marudevan                    |
| 24. Amarshana    | 42. Sunadshatra                  |

- |                 |                |
|-----------------|----------------|
| 43. Pushkara    | 51. Sanjayan   |
| 44. Antariksha  | 52. Sakyan     |
| 45. Sutapa      | 53. Sudhoda    |
| 46. Amitrajit   | 54. Langala    |
| 47. Brihatraja  | 55. Prasenajit |
| 48. Barhi       | 56. Kshutraka  |
| 49. Kritayagnan | 57. Rangan     |
| 50. Rananjayan  | 58. Suratan    |
|                 | 59. Sumitra    |

With Sumitra Ikshavaku dynasty terminated in Kali Yuga. Assuming that each reign lasted an average of 20 years, somewhere by 4300 B.C., Sri Rama should have ruled. A search between 4300 to 4500 B.C. would have been sufficient. Yet in order not to miss any possibility of a date before 4300 B.C., it was thought that a search between 3500 B.C. and 4700 B.C., would be more exhaustive. So though tedious it was decided to select the period 3500 B.C. to 4700 B.C. for a thorough investigation.

#### Method of Investigation:

We have already seen earlier that the year in which Sri Rama was born, both the solar and lunar new years occurred on the same date. So we have to find out first the solar new year days between 3500 B.C., and 4700 B.C.

Late Diwan Bahadur L.D. Swamikannu Pillai has worked out the solar new year days in his book 'Indian Ephemeris'. He has worked out for the period 1 B.C., to 3201 B.C. We require these solar new year days for the earlier period.

So the author of this book has calculated the same up to 4700 B.C., following the same method and formula adopted by L.D. Swamikannu Pillai. These results are given in Table II. 1.

It may be noted that the entry of Sun in the sign of Aries, i.e., Mesha as per the sidereal luni-solar system gets shifted backward by about a day for every 100 years from 1 B.C. This is due per the precession of equinox and satisfies all the technical parameters required. When one is engaged in investigating and fact finding research work of historical periods, one has to adopt scientific methods acceptable to all. This method gives directly the year, month, date and exact

moment of the entry of Sun in Aries. It plays the key function in short-listing the probable years of birth of Sri Rama. This method of approach is preferred by the author to simplify the selection and narrow down the probable years by the well recommended process of elimination. Perhaps, but for this method, the selection of the probable years would have continued to be baffling, since the fixation of the date of birth of Sri Rama has been defying a satisfactory solution so long, even though Herculean attempts were made by great scholars, scientists, astronomers, astrologers etc., of international repute, both in the near and distant past almost in most parts of this country as well as in advanced countries. Instead, if the author had given the date of birth straight in a take-it-for-granted style, without accounting as to how it was arrived at, it may lead a reader to guess that there can be some more dates qualifying for consideration. Now any reader will get convinced that there is no possibility of any other date satisfying the technical parameters of fixing the date of birth of Sri Rama.

#### Description of Table II. 1

Section k of the Table tells us that in 4401 B.C., the solar year commenced on February, 4.45455 day. Section n further shows that for 32 years of the century, the fraction to be subtracted for determining the commencement of solar year is 0.28020. So in the year 4433 B.C., the solar new year commenced on February, 3.1743425 day, according to Surya Sidhanta. Table II. 2 which gives the fraction to be added or subtracted as the case may be, for determining the commencement of solar year in that century is also appended.

With the help of these two tables, it is possible to find out the solar new year from 1 B.C., to 4701 B.C. The commencements of solar new year, month and fraction of the day are given in the columns (2) and (3) in Table II. 3.

#### Selection of solar new years for probable years of birth of Sri Rama:

Valmiki has stated that Sun was in ucha position, when Sri Rama was born. Sun will be in ucha position between  $8^{\circ}.30'$  and  $11^{\circ}.30'$  Sun should be at  $9^{\circ}.0'$  at the time of birth of Sri Rama, as we have already discussed. It can be so only if the birth took place on the

ninth day from any solar new year day. Evidently the solar new year should have commenced close to the 0 hours on the particular solar new year. Even if it commenced at 0 hours, the Sun can be near  $8^{\circ}.30'$  on the ninth day at 10.799667 hours A.M., assuming that the daily motion of Sun was 1 degree per day. With an usual higher rate of daily motion, the longitude can be  $9^{\circ}$ . Any way we have fixed the longitude of Sun as  $9^{\circ}$  at the time of Sri Rama's birth, for the following reasons.

Valmiki has also said that when the twins Sri Lakshmana and Sri Satrugna were born in Karkataka lagna, the Sun attained its most exalted position, which is  $10^{\circ}$ . Sri Rama's birth took place in the same Karkataka lagna on the previous day. As Sun's daily motion is  $1^{\circ}$  the longitude of Sun at the time of His birth in Karkataka lagna must necessarily be  $9^{\circ}$ . This fixation is as per the direction of Valmiki.

So in selecting the probable year of birth of Sri Rama, it is necessary that the solar year commenced close to 0 hour and in any case not later than sunrise. Thus solar years which commenced between 0 to 0.25 day are selected for further investigation.

All such solar years selected are given in the short list.

**Lunar New Year:**

As is well known, Chaitra Sukla Pratama follows the Palguna Amavasya.

As is said in Chapter 27, verse 38 of Brahmananda Purana,

एक रात्रे समेयातां सूर्यौ चन्द्रससावुभौ

अमावास्यानिशायान्तु तस्यामुक्तः सदावसेत् ॥

night when the Sun and Moon end together is known as Amavasya. Titis:

Titis are in use over the whole of India for religious purposes and over the greater part of it for civil purposes also.

Reckoning a day by a titi appears to have been the way for religious purposes, even prior to the time of Rama. To understand titis, our ancients should have mastered the system thoroughly. Hence titis took the lead. The Sun and Moon are together at the end of the New Moon. Thereafter the Moon gains over the Sun and comes back to the Sun at the end of the next New Moon.

The travel of a lunation of a synodical month is divided into thirty equal parts i.e., titis or lunar days of equal mean length.



The first 15 titis corresponding to the bright half of the month are called Sukla Paksha and they are named as Pratama, Dwitiya etc. The fifteenth in Poornima (Full Moon). Again the titis are counted as before Pratama, Dwitiya, Tritiya etc. These fifteen titis are in the dark fortnight (Krishna Paksha). The last tithi or the 30th tithi is the New Moon or Amavasya. In Table II.3. these titis are given in Roman figures and they represent the titis as mentioned below and their equivalent synodical days are given against each tithi.

| Tithi in Roman      | Equivalent tithi | Synodical days | Tithi in Roman        | Equivalent tithi | Synodical days |
|---------------------|------------------|----------------|-----------------------|------------------|----------------|
| <b>SUKLA PAKSHA</b> |                  |                | <b>KRISHNA PAKSHA</b> |                  |                |
| 0 - 1               | Pratama          | 0.9843529      | 15 - 16               | Pratama          | 15.749646      |
| 1 - 2               | Dwitiya          | 1.9687058      | 16 - 17               | Dwitiya          | 16.73999       |
| 2 - 3               | Tritiya          | 2.9530587      | 17 - 18               | Tritiya          | 17.71835       |
| 3 - 4               | Chaturti         | 3.9374116      | 18 - 19               | Chaturti         | 18.70270       |
| 4 - 5               | Panchami         | 4.9217645      | 19 - 20               | Panchami         | 19.68705       |
| 5 - 6               | Sashti           | 5.9061174      | 20 - 21               | Sashti           | 20.67141       |
| 6 - 7               | Saptami          | 6.8904703      | 21 - 22               | Saptami          | 21.65576       |
| 7 - 8               | Ashtami          | 7.8591761      | 22 - 23               | Ashtami          | 22.64011       |
| 8 - 9               | Navami           | 8.8591761      | 23 - 24               | Navami           | 23.38969       |
| 9 - 10              | Dasami           | 9.843529       | 24 - 25               | Dasami           | 24.60882       |
| 10 - 11             | Ekadasi          | 10.827882      | 25 - 26               | Ekadasi          | 25.59317       |
| 11 - 12             | Dwadasi          | 11.812235      | 26 - 27               | Dwadasi          | 26.57752       |
| 12 - 13             | Trayodasi        | 12.796588      | 27 - 28               | Trayodasi        | 27.56188       |
| 13 - 14             | Chaturdasi       | 13.780941      | 28 - 29               | Chaturdasi       | 28.54623       |
| 14 - 15             | Poornima         | 14.749646      | 29 - 30               | Amavasya         | 29.53058       |

#### Calculation of Titis:

Thus calculation of titis become important and frequent. Calculation of days between two dates e.g., between 17th February 3102 B.C., and 11th February 4433 B.C. is tedious and tiresome. If we reckon these two dates by a convenient system, the job becomes simple. One such system is reckoning the year and the day by Julian Day. By the use of the Julian days the interval between any two events can at once be established in precise manner. The starting point of the system is 4713 B.C. One year consists of  $365\frac{1}{4}$  equal days.

Calculation of Julian day is as follows.

1. Subtract the English B.C. year from 4713 B.C.
2. Multiply the result by 365.
3. Add 3 to the result of item (1) and divide by 4.
4. Add the integer part of the result arrived at above, to item (2).
5. Add to the above the number of days from 1st January till the required date excluding the 1st January.
6. The total is the Julian Day for the required date and year.

Example:

Find out the Julian Day for 11th February, 4433 B.C.

|  |              |
|--|--------------|
| 1 Subtract 4433 from 4713  | = 280        |
| 2 Multiply (1) by 365  | = 102200     |
| 3 Add 3 to 280 and divide by 4   | = 70.75      |
| 4 Add the integer part i.e., 70 to (2)   | = 102270     |
| 5 Add the number of days from 1st<br>January 4433 B.C. to 11th February<br>4433 B.C. excluding 1st January | = 41         |
|  | <hr/> 102311 |

So the Julian Day for the required date is 102311.

Typical calculation of titi for a particular day:

Adopting the Amavasya on the 17th February, 3102 B.C., as the Key Amavasya, let us now calculate the titi for the 11th February 4433 B.C.

|                                       |              |
|---------------------------------------|--------------|
| Julian Day on the 17th Feb. 3102 B.C. | 588465       |
| Julian Day on the 11th Feb. 4433 B.C. | 102311       |
| Difference                            | <hr/> 486154 |

Dividing the difference by 29.530587 synodical days,  
We get 16462.727 i.e., 16462 lunations or synodical periods are completed leaving a balance of 0.727; a lunar month consists of 30 titis. So the balance is  $0.727 \times 30 = 21.72$  titis.

Since we are calculating from 3102 B.C., to 4433 B.C., in the descending order, we have to subtract this from 30 and we get 8.28 i.e., Navami as the titi.

This means that the titi at midnight (24 hours) on the 11th Feb. 4433 B.C. was Sukla Navami, with a balance of  $(9 - 8.28) 0.72$  day.

We want the titi at sunrise on the next day. So we have to add 0.25 to this and we get 8.53 as the titi.

The titis under column 4 of Table II.3 are-calculated as above.

#### Selection of titis:

As per Hindu calender, a day is reckoned from sunrise to sunrise. When Palguna Amaṡasya ends during this period, the Mesha Sukla Pratama commences. In that case the solar and lunar new years will coincide. We have already seen earlier that the solar and lunar new years coincided in the year of Sri Rama's birth. This is a pre-requisite. Sri Rama was born at 10 hr. 47m. 48 secs. on the 9th day of the commencement of the solar year. The titi at that moment was Sukla Navami. What should be the range of titi at sunrise on the second day of the solar year, so that the Sukla Navami will rule at the time of Sri Rama's birth? Now let us calculate the same.

#### Duration of titis:

The duration in days between any two important events are as follows.

| From   | To                                 | No.of days. |
|--|------------------------------------|-------------|
| 0.0hour on solar<br>new year day                 | 6 a.m on the<br>next day           | 1.25        |
| -do-   | 10h.47m.48 sec.<br>on the 9th day. | 8.4498611   |
| 6 a/m on the 2nd<br>day to solar new<br>year day | -do-                               | 7.1998611   |

A normal titi extends over 0.9843 of a day; but the solar and lunar anamolies may make a titi or nakshatra longer or shorter. A reference to any almanac especially that of vakya sidhanta, would reveal that the duration may vary from 52 to 68 ghatikas or naligais ordinarily. At times, the limit may go beyond 68 ghatikas also. A difference of 8 ghatikas on either side of 60 ghatikas work out to 13.33%. If we apply this percentage to the normal duration of 0.9844,

the parameters will be 0.8531795 and 1.1156205 days. Let us now calculate in tabulated form the various parameters for the occurrence of Sukla Navami on the 9th day of the solar year.

Table

| Day in<br>solar<br>year | Time    | Lower                       | Parameter                              |                             | Upper Parameter          |   |                                       |
|-------------------------|---------|-----------------------------|--|-----------------------------|--------------------------|---|---------------------------------------|
|                         |         | Length/<br>Duration<br>days | forBegin<br>ning of<br>Sukla<br>Navami | forend<br>ofSukla<br>Navami | Length/<br>Dura-<br>tion | forBegin-<br>ning of<br>Sukla<br>Navami | for End-<br>ing of<br>Sukla<br>Navami |
| 2nd                     | 6 A.M.  | 0.853                       | 1.859                                  | 2.859                       | 1.112                    | 0.003                                   | 0.994                                 |
| 3rd                     | "       | 0.853                       | 2.712                                  | 3.712                       | "                        | 1.116                                   | 2.106                                 |
| 4th                     | "       | 0.853                       | 3.565                                  | 4.565                       | "                        | 2.227                                   | 3.218                                 |
| 5th                     | "       | 0.853                       | 4.418                                  | 5.418                       | "                        | 3.339                                   | 4.33                                  |
| 6th                     | "       | 0.853                       | 5.271                                  | 6.271                       | "                        | 4.451                                   | 5.442                                 |
| 7th                     | "       | 0.853                       | 6.124                                  | 7.124                       | "                        | 5.563                                   | 6.554                                 |
| 8th                     | "       | 0.853                       | 6.977                                  | 7.977                       | "                        | 6.675                                   | 7.66                                  |
| 9th                     | "       | 0.853                       | 7.83                                   | 8.83                        | "                        | 7.78                                    | 8.78                                  |
| 9th                     | 4, 8hrs | 0.17                        | 8.00                                   | 9.00                        | 0.222                    | 8.0                                     | 9.0                                   |

#### Summary:

Thus we find that if the titi at sunrise on the next day of the solar new year which is given under column 4 is in the range of 0.003 to 2.859, the titi at the time of Sri Rama's birth can be between 8.0 and 9.0 which is Sukla Navami.

Such years have been identified and shortlisted for purpose of detailed investigation.

As a process of this investigation, let us work out an example say for 3rd February, 4433 B.C.

Calculation for solar new year on the 3rd February 4433 B.C.

Julian Day 102303

Commencement of Solar year: 0.174342 day in February, 4433 B.C.  
Length of a titi in days: 1.069.

| Titi at 6 a.m | on Julian Day | 102304 (Table II.3) | 0.31  |
|---------------|---------------|---------------------|-------|
| "             | "             | 102305              | 1.379 |
| "             | "             | 102306              | 2.448 |
| "             | "             | 102307              | 3.517 |
| "             | "             | 102308              | 4.586 |
| "             | "             | 102309              | 5.655 |
| "             | "             | 102310              | 6.724 |
| "             | "             | 102311              | 7.793 |

Length of titi from sunrise up to the birth time of Sri Rama

$$\frac{1.069}{24} \times 4.796667$$

$$= 0.214 \text{ and adding to the above } 8.006$$

Thus the titi at 10h. 47m. 48secs. on the 11th February 4433 B.C. is Sukla Navami.

Note: The births of Sri Rama, Sri Bharata and the twins Sri Lakshmana and Sri Satrugna took place in the constellations of Punarvasu, Pushya and Ashlesha (twins) respectively; but the poet is silent about the titi at the time of the births of the twins. Evidently the titi at that time also must be the same as Navami. The length of the titi on that day was 1.069 days. So Sri Rama's birth should have taken place almost at the commencement of Navami titi and then only Navami titi could have extended up to the birth time of the twins on the next day. This is an important factor for compliance.

We now confirm that the birth of Sri Rama was almost at the commencement of Navami.

*He, on the other hand, who honours as inviolable the  
plighted word, be it productive of good or evil, is a hero  
and the best of men.*

*Bala Kanda - 4 - Canto 30 - Verse 72*

TABLE II.1

Commencement of solar new year, month and date:

| Year of<br>B.C. | Commencement of the<br>year, month & date<br>and fraction of day. |          | Year of<br>B.C. | Commencement of the<br>year, month & date<br>and fraction of day. |          |
|-----------------|---|----------|-----------------|---|----------|
|                 |   | k        |                 |   | k        |
| 1               | March   | 13.98310 | 2501            | Feb.  | 21.09189 |
| 101             | "   | 13.10745 | 2601            | "   | 20.21624 |
| 201             | "   | 12.23180 | 2701            | "   | 19.34059 |
| 301             | "   | 11.35615 | 2801            | "   | 18.46494 |
| 401             | "   | 10.48051 | 2901            | "   | 17.58930 |
| 501             | "   | 9.60486  | 3001            | "   | 16.71365 |
| 601             | "   | 8.72921  | 3101            | "   | 15.83800 |
| 701             | "   | 7.85356  | 3102            | "   | 15.57924 |
| 801             | "   | 6.97791  | 3201            | "   | 14.96235 |
| 901             | "   | 6.10226  | 3301            | "   | 14.0867  |
| 1001            | "   | 5.22662  | 3401            | "   | 13.21105 |
| 1101            | "   | 4.35077  | 3501            | "   | 12.3354  |
| 1201            | "   | 3.47532  | 3601            | "   | 11.45975 |
| 1301            | "   | 2.59967  | 3701            | "   | 10.5841  |
| 1401            | "   | 1.72402  | 3801            | "   | 9.70845  |
| 1501            | Feb.  | 29.84837 | 3901            | "   | 8.8328   |
| 1601            | "   | 28.97273 | 4001            | "   | 7.95715  |
| 1701            | "   | 28.09708 | 4101            | "   | 7.0815   |
| 1801            | "   | 27.22143 | 4201            | "   | 6.20585  |
| 1901            | "   | 26.34578 | 4301            | "   | 5.3302   |
| 2001            | "   | 25.47013 | 4401            | "   | 4.45455  |
| 2101            | "   | 24.59448 | 4501            | "   | 3.5789   |
| 2202            | "   | 23.71883 | 4601            | "   | 2.70325  |
| 2301            | "   | 22.84319 | 4701            | "   | 1.8276   |
| 2401            | "   | 21.96754 |                 |   |          |

Table II.2.

Fraction of day marking commencement of solar year:

| Years | n       | years | n      | years | n      |
|-------|---------|-------|--------|-------|--------|
| 1.    | 0.25876 | 35.   | .05647 | 68.   | .59543 |
| 2.    | 0.51751 | 36.   | .31523 | 69.   | .85419 |
| 3.    | .77627  | 37.   | .57399 | 70.   | .11295 |
| 4.    | .03502  | 38.   | .83274 | 71.   | .37170 |
| 5.    | .29378  | 39.   | .09150 | 72.   | .63046 |
| 6.    | .55254  | 40.   | .35026 | 73.   | .88922 |
| 7.    | .81129  | 41.   | .60901 | 74.   | .14797 |
| 8.    | .07005  | 42.   | .86777 | 75.   | .40673 |
| 9.    | .32881  | 43.   | .12652 | 76.   | .66549 |
| 10.   | .58756  | 44.   | .38528 | 77.   | .92424 |
| 11.   | .84632  | 45.   | .64404 | 78.   | .18300 |
| 12.   | .10508  | 46.   | .90279 | 79.   | .44170 |
| 13.   | .36383  | 47.   | .16155 | 80.   | .70051 |
| 14.   | .62259  | 48.   | .42031 | 81.   | .95927 |
| 15.   | .88135  | 49.   | .67906 | 82.   | .21802 |
| 16.   | .14010  | 50.   | .93782 | 83.   | .47678 |
| 17.   | .39886  | 51.   | .19658 | 84.   | .73554 |
| 18.   | .65761  | 52.   | .45533 | 85.   | .99430 |
| 19.   | .91637  | 53.   | .71409 | 86.   | .25305 |
| 20.   | .17513  | 54.   | .97284 | 87.   | .51181 |
| 21.   | .43388  | 55.   | .23160 | 88.   | .77056 |
| 22.   | .69264  | 56.   | .49036 | 89.   | .02932 |
| 23.   | .95140  | 57.   | .74911 | 90.   | .28808 |
| 24.   | .21015  | 58.   | .00787 | 91.   | .54683 |
| 25.   | .46891  | 59.   | .26663 | 92.   | .80559 |
| 26.   | 0.72767 | 60.   | .52538 | 93.   | .06434 |
| 27.   | .98642  | 61.   | .78414 | 94.   | .32310 |
| 28.   | .24518  | 62.   | .04290 | 95.   | .58186 |
| 29.   | .50393  | 63.   | .30165 | 96.   | .84061 |
| 30.   | .76269  | 64.   | .56041 | 97.   | .09937 |
| 31.   | .02145  | 65.   | .81971 | 98.   | .35813 |
| 32.   | .28020  | 66.   | .07792 | 99.   | .61688 |
| 33.   | .53896  | 67.   | .33668 | 100.  | .87565 |
| 34.   | .79772  |       |        |       |        |

TABLE II-3

SEARCH FOR THE PROBABLE YEARS OF SRI RAMA'S BIRTH  
FROM 3500 TO 4700 B.C.

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 442725        | 3501                    | Feb. 12.3354  | 23.593                                   | -   |
| 442360        | 3502                    | " 12.076644   | 12.79                                    | -   |
| 441995        | 3503                    | " 12.817887   | 1.99                                     | -   |
| 441630        | <b>3504</b>             | " 12.559131   | 21.187                                   | -   |
| 441264        | 3505                    | " 12.300374   | 9.37                                     | -   |
| 440889        | 3506                    | " 12.041618   | 28.568                                   | -   |
| 440534        | 3507                    | " 12.782861   | 17.765                                   | -   |
| 440169        | <b>3508</b>             | " 12.524105   | 6.963                                    | -   |
| 439803        | 3509                    | " 12.265348   | 25.145                                   | -   |
| 439438        | 3510                    | " 12.006592   | 14.343                                   | -   |
| 439073        | 3511                    | " 12.747835   | 3.541                                    | -   |
| 438708        | <b>3512</b>             | " 12.489078   | 22.739                                   | -   |
| 438342        | 3513                    | " 12.230222   | 10.921                                   | -   |
| 437977        | 3514                    | " 12.971565   | 0.118                                    | -   |
| 437612        | 3515                    | " 12.712809   | 19.316                                   | -   |
| 437247        | <b>3516</b>             | " 12.4540525  | 8.514                                    | -   |
| 436881        | 3517                    | " 12.195296   | 26.696                                   | -   |
| 436516        | 3518                    | " 12.936539   | 15.894                                   | -   |
| 436151        | 3519                    | " 12.677783   | 5.092                                    | -   |
| 435786        | <b>3520</b>             | " 12.419026   | 24.29                                    | -   |
| 435420        | 3521                    | " 12.16027  | 12.475                                   | -   |
| 435055        | 3522                    | " 12.901513   | 1.673                                    | -   |
| 434690        | 3523                    | " 12.642757   | 20.871                                   | -   |
| 434325        | <b>3524</b>             | " 12.384000   | 10.069                                   | -   |
| 433959        | 3525                    | " 12.125244   | 28.251                                   | -   |



| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Tith at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investigation |
|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 433594        | 3526                    | Feb. 12.8664875   | 17.449                                   | -  |
| 433229        | 3527                    | " 12.607731   | 6.6647                                   | -  |
| 432864        | <b>3528</b>             | " 12.348974   | 25.845                                   | -  |
| 432498        | 3529                    | " 12.090218   | 14.027                                   | -  |
| 432133        | 3530                    | " 12.831461   | 3.225                                    | -  |
| 431768        | 3531                    | " 12.572705   | 22.423                                   | -  |
| 431403        | <b>3532</b>             | " 12.313948   | 11.621                                   | -  |
| 431037        | 3533                    | " 12.055192   | 29.803                                   | -  |
| 430672        | 3534                    | " 12.796435   | 19.001                                   | -  |
| 430307        | 3535                    | " 12.537679   | 8.189                                    | -  |
| 429942        | <b>3536</b>             | " 12.278922   | 27.397                                   | -  |
| 429576        | 3537                    | " 12.020166   | 15.579                                   | -  |
| 429211        | 3538                    | " 12.764095   | 4.777                                    | -  |
| 428846        | 3539                    | " 12.502653   | 23.975                                   | -  |
| 428481        | <b>3540</b>             | " 12.243896   | 13.173                                   | -  |
| 428115        | 3541                    | " 12.98514  | 1.355                                    | -  |
| 428750        | 3542                    | " 12.726383   | 20.553                                   | -  |
| 427385        | 3543                    | " 12.467627   | 9.751                                    | -  |
| 427020        | <b>3544</b>             | " 12.20887  | 28.949                                   | -  |
| 426654        | 3545                    | " 12.950114   | 17.131                                   | -  |
| 426289        | 3546                    | " 12.691357   | 6.329                                    | -  |
| 425924        | 3547                    | " 12.432601   | 25.527                                   | -  |
| 425559        | <b>3548</b>             | " 12.173844   | 14.725                                   | -  |
| 425192        | 3549                    | " 11.915088   | 1.891                                    | -  |
| 424827        | 3550                    | " 11.656332   | 21.089                                   | -  |
| 424462        | 3551                    | " 11.397576   | 10.287                                   | -  |
| 424097        | <b>3552</b>             | " 11.138819   | 29.485                                   | -  |
| 423731        | 3553                    | " 11.88062  | 17.667                                   | -  |
| 423366        | 3554                    | " 11.621306   | 6.865                                    | -  |
| 423001        | 3555                    | " 11.362549   | 26.063                                   | -  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 422636        | <b>3556</b>             | Feb. 11.103793  | 15.262                                   | -   |
| 422270        | 3557                    | " 11.845036   | 3.464                                    | -   |
| 421905        | 3558                    | " 11.58268  | 22.42                                    | -   |
| 421540        | 3559                    | " 11.327523   | 11.84                                    | -   |
| <b>421175</b> | <b>3560</b>             | " <b>11.068767</b>  | <b>1.038</b>                             | <b>Yes</b>                                    |
| 420809        | 3561                    | " 11.81001  | 19.219                                   | -   |
| 420444        | 3562                    | " 11.551254   | 8.447                                    | -   |
| 420079        | 3563                    | " 11.292497   | 27.615                                   | -   |
| 419714        | <b>3564</b>             | " 11.033741   | 16.813                                   | -   |
| 419348        | 3565                    | " 11.774984   | 4.995                                    | -   |
| 418983        | 3566                    | " 11.516228   | 24.193                                   | -   |
| 418618        | 3567                    | " 11.257471   | 13.394                                   | -   |
| 418253        | <b>3568</b>             | " 11.998715   | 2.589                                    | -   |
| 417887        | 3569                    | " 11.739958   | 20.771                                   | -   |
| 417522        | 3570                    | " 11.481202   | 9.949                                    | -   |
| 417157        | 3571                    | " 11.222445   | 29.167                                   | -   |
| 416792        | <b>3572</b>             | " 11.963689   | 18.365                                   | -   |
| 416426        | 3573                    | " 11.704932   | 6.547                                    | -   |
| 416061        | 3574                    | " 11.446176   | 25.745                                   | -   |
| 415696        | 3575                    | " 11.187419   | 14.943                                   | -   |
| 415331        | <b>3576</b>             | " 11.928663   | 4.141                                    | -   |
| 414965        | 3577                    | " 11.669906   | 22.323                                   | -   |
| 414600        | 3578                    | " 11.41115  | 11.521                                   | -   |
| <b>414235</b> | <b>3579</b>             | " <b>11.152293</b>  | <b>0.719</b>                             | <b>Yes</b>                                    |
| 413870        | <b>3580</b>             | " 11.893637   | 19.918                                   | -   |
| 413504        | 3581                    | " 11.63488  | 8.1                                      | -   |
| 413139        | 3582                    | " 11.376124   | 27.298                                   | -   |
| 412774        | 3583                    | " 11.117367   | 16.496                                   | -   |
| 412409        | <b>3584</b>             | " 11.858611   | 5.694                                    | -   |
| 412043        | 3585                    | " 11.599854   | 23.876                                   | -   |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 411678        | 3586                 | Feb. 11.341098   | 13.074                          |                                    |
| <b>411413</b> | <b>3587</b>          | " <b>11.082341</b>   | <b>2.272</b>                    | <b>Yes</b>                         |
| 410948        | <b>3588</b>          | " 11.823585  | 21.471                          | -                                  |
| 410582        | 3589                 | " 11.564828  | 9.652                           | -                                  |
| 410217        | 3590                 | " 11.306072  | 28.85                           | -                                  |
| 409852        | 3591                 | " 11.047315  | 18.049                          | -                                  |
| 409487        | <b>3592</b>          | " 11.788559  | 7.247                           | -                                  |
| 409121        | 3593                 | " 11.529802  | 25.429                          | -                                  |
| 408756        | 3594                 | " 11.271046  | 14.622                          | -                                  |
| 408391        | 3595                 | " 11.012289  | 3.325                           | -                                  |
| 408026        | <b>3596</b>          | " 11.753533  | 23.023                          | -                                  |
| 407660        | 3597                 | " 11.494776  | 11.205                          | -                                  |
| <b>407295</b> | <b>3598</b>          | " <b>11.23602</b>  | <b>0.402</b>                    | <b>Yes</b>                         |
| 406930        | 3599                 | " 11.977263  | 19.601                          | -                                  |
| 406565        | <b>3600</b>          | " 11.718507  | 8.8                             | -                                  |
| 406199        | 3601                 | " 11.45975   | 26.982                          | -                                  |
| 405834        | 3602                 | " 11.200994  | 16.81                           | -                                  |
| 405469        | 3603                 | " 11.942237  | 5.378                           | -                                  |
| 405104        | <b>3604</b>          | " 11.683481  | 24.576                          | -                                  |
| 404738        | 3605                 | " 11.424726  | 12.758                          | -                                  |
| <b>404373</b> | <b>3606</b>          | " <b>11.165968</b>   | <b>1.956</b>                    | <b>Yes</b>                         |
| 404008        | 3607                 | " 11.907211  | 21.154                          | -                                  |
| 403643        | <b>3608</b>          | " 11.648454  | 10.352                          | -                                  |
| 403277        | 3609                 | " 11.389698  | 28.534                          | -                                  |
| 402912        | 3610                 | " 11.130941  | 17.737                          | -                                  |
| 402547        | 3611                 | " 11.872185  | 6.93                            | -                                  |
| 402182        | <b>3612</b>          | " 11.613428  | 26.128                          | -                                  |
| 401816        | 3613                 | " 11.354672  | 14.31                           | -                                  |
| 401451        | 3614                 | " 11.0959155   | 3.508                           | -                                  |
| 401086        | 3615                 | " 11.837159  | 22.706                          | -                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 400721        | <b>3616</b>             | Feb. 11.578402  | 11.904                                   | -   |
| 400355        | 3617                    | " 11.319646   | 0.086                                    | -   |
| 399990        | 3618                    | " 11.060889   | 19.284                                   | -   |
| 399625        | 3619                    | " 11.800213   | 8.492                                    | -   |
| 399260        | <b>3620</b>             | " 11.543376   | 27.681                                   | -   |
| 398894        | 3621                    | " 11.28462  | 15.864                                   | -   |
| 398529        | 3622                    | " 11.025863   | 5.062                                    | -   |
| 398164        | 3623                    | " 11.767107   | 24.26                                    | -   |
| 397799        | <b>3624</b>             | " 11.50835  | 13.458                                   | -   |
| <b>397433</b> | <b>3625</b>             | " 11.249594   | 1.64                                     | Yes   |
| 397068        | 3626                    | " 11.990837   | 20.838                                   | -   |
| 396703        | 3627                    | " 11.732081   | 10.036                                   | -   |
| 396338        | <b>3628</b>             | " 11.473324   | 29.234                                   | -   |
| 395972        | 3629                    | " 11.214568   | 17.416                                   | -   |
| 395607        | 3630                    | " 11.955811   | 6.614                                    | -   |
| 395242        | 3631                    | " 11.697055   | 25.813                                   | -   |
| 394877        | <b>3632</b>             | " 11.438298   | 15.01                                    | -   |
| 394511        | 3633                    | " 11.179542   | 3.193                                    | -   |
| 394146        | 3634                    | " 11.920785   | 22.391                                   | -   |
| 393781        | 3635                    | " 11.662029   | 11.589                                   | -   |
| 393416        | <b>3636</b>             | " 11.403272   | 0.787                                    | -   |
| 393050        | 3637                    | " 11.144516   | 18.969                                   | -   |
| 392685        | 3638                    | " 11.885759   | 8.167                                    | -   |
| 392322        | 3639                    | " 11.627003   | 27.365                                   | -   |
| 391955        | <b>3640</b>             | " 11.368246   | 16.563                                   | -   |
| 391589        | 3641                    | " 11.10949  | 4.743                                    | -   |
| 391224        | 3642                    | " 11.850733   | 23.941                                   | -   |
| 390859        | 3643                    | " 11.591977   | 13.139                                   | -   |
| 390494        | <b>3644</b>             | " 11.333220   | 2.337                                    | -   |
| 390128        | 3645                    | " 11.074464   | 20.52                                    | -   |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investigation |
|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 389762        | 3646                    | Feb. 10.815708  | 8.701                                    | -  |
| 389397        | 3647                    | " 10.556952   | 27.899                                   | -  |
| 389032        | <b>3648</b>             | " 10.298295   | 17.097                                   | -  |
| 388666        | 3649                    | " 10.039439   | 5.279                                    | -  |
| 388301        | 3650                    | " 10.780682   | 24.477                                   | -  |
| 387936        | 3651                    | " 10.521926   | 13.675                                   | -  |
| 387571        | <b>3652</b>             | " 10.263169   | 2.873                                    | -  |
| 387205        | 3653                    | " 10.004143   | 21.055                                   | -  |
| 386840        | 3654                    | " 10.745656   | 10.253                                   | -  |
| 386475        | 3655                    | " 10.4869   | 29.451                                   | -  |
| 386110        | <b>3656</b>             | " 10.228143   | 18.649                                   | -  |
| 385744        | 3657                    | " 10.969387   | 6.832                                    | -  |
| 385379        | 3658                    | " 10.710636   | 26.029                                   | -  |
| 385014        | 3659                    | " 10.451874   | 15.227                                   | -  |
| 384649        | <b>3660</b>             | " 10.193117   | 4.425                                    | -  |
| 384283        | 3661                    | " 10.934361   | 22.608                                   | -  |
| 383918        | 3662                    | " 10.675604   | 11.806                                   | -  |
| 383553        | 3663                    | " 10.416848   | 1.004                                    | -  |
| 383188        | <b>3664</b>             | " 10.158091   | 20.202                                   | -  |
| 382822        | 3665                    | " 10.899335   | 8.384                                    | -  |
| 382457        | 3666                    | " 10.640578   | 27.582                                   | -  |
| 382092        | 3667                    | " 10.381822   | 16.78                                    | -  |
| 381727        | <b>3668</b>             | " 10.123065   | 5.978                                    | -  |
| 381361        | 3669                    | " 10.864309   | 24.16                                    | -  |
| 380996        | 3670                    | " 10.605552   | 13.358                                   | -  |
| 380631        | 3671                    | " 10.346796   | 2.556                                    | -  |
| 380266        | <b>3672</b>             | " 10.088039   | 21.754                                   | -  |
| 379900        | 3673                    | " 10.829283   | 9.936                                    | -  |
| 379535        | 3674                    | " 10.570526   | 29.134                                   | -  |
| 379170        | 3675                    | " 10.31177  | 18.332                                   | -  |



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| Julian Day | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 378805     | <b>3676</b>          | Feb. 10.053013   | 7.53                            | -                                  |
| 378439     | 3677                 | " 10.794257  | 25.713                          | -                                  |
| 378074     | 3678                 | " 10.5355  | 14.91                           | -                                  |
| 377709     | 3679                 | " 10.276744  | 4.108                           | -                                  |
| 377344     | <b>3680</b>          | " 10.017987  | 23.306                          | -                                  |
| 376978     | 3681                 | " 10.759231  | 11.49                           | -                                  |
| 376613     | 3682                 | " 10.500474  | 0.688                           | -                                  |
| 376248     | 3683                 | " 10.241718  | 19.886                          | -                                  |
| 375883     | <b>3684</b>          | " 10.982961  | 9.084                           | -                                  |
| 375517     | 3685                 | " 10.724205  | 27.266                          | -                                  |
| 375152     | 3686                 | " 10.465448  | 16.464                          | -                                  |
| 374787     | 3687                 | " 10.206692  | 5.665                           | -                                  |
| 374422     | <b>3688</b>          | " 10.947935  | 24.84                           | -                                  |
| 374056     | 3689                 | " 10.689179  | 13.042                          | -                                  |
| 373691     | 3690                 | " 10.430422  | 2.24                            | -                                  |
| 373326     | 3691                 | " 10.171666  | 21.438                          | -                                  |
| 372961     | <b>3692</b>          | " 10.912909  | 10.636                          | -                                  |
| 372595     | 3693                 | " 10.654153  | 28.818                          | -                                  |
| 372230     | 3694                 | " 10.395396  | 18.016                          | -                                  |
| 371865     | 3695                 | " 10.13664   | 7.21                            | -                                  |
| 371500     | <b>3696</b>          | " 10.877883  | 26.412                          | -                                  |
| 371134     | 3697                 | " 10.619127  | 14.594                          | -                                  |
| 370769     | 3698                 | " 10.36037   | 3.792                           | -                                  |
| 370404     | 3699                 | " 10.101614  | 22.99                           | -                                  |
| 370039     | <b>3700</b>          | " 10.842857  | 12.188                          | -                                  |
| 369673     | 3701                 | " 10.584101  | 0.37                            | -                                  |
| 369308     | 3702                 | " 10.325344  | 19.568                          | -                                  |
| 368943     | 3703                 | " 10.066588  | 8.766                           | -                                  |
| 368578     | <b>3704</b>          | " 10.807831  | 27.964                          | -                                  |
| 368212     | 3705                 | " 10.549074  | 16.146                          | -                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 367847        | 3706                    | Feb. 10.290318  | 5.344                                    | -   |
| 367482        | 3707                    | " 10.031561   | 24.542                                   | -   |
| 367117        | <b>3708</b>             | " 10.772805   | 13.74                                    | -   |
| 366751        | 3709                    | " 10.514048   | 1.922                                    | -   |
| 366386        | 3710                    | " 10.255292   | 21.12                                    | -   |
| 366021        | 3711                    | " 10.996535   | 10.318                                   | -   |
| 365656        | <b>3712</b>             | " 10.737779   | 29.516                                   | -   |
| 365290        | 3713                    | " 10.479022   | 17.699                                   | -   |
| 364925        | 3714                    | " 10.220266   | 6.897                                    | -   |
| 364560        | 3715                    | " 10.961509   | 26.095                                   | -   |
| 364195        | <b>3716</b>             | " 10.702753   | 15.293                                   | -   |
| 363829        | 3717                    | " 10.443996   | 3.475                                    | -   |
| 363464        | 3718                    | " 10.18524  | 22.673                                   | -   |
| 363099        | 3719                    | " 10.926483   | 11.871                                   | -   |
| 362734        | <b>3720</b>             | " 10.667727   | 1.069                                    | -   |
| 362368        | 3721                    | " 10.40897  | 19.251                                   | -   |
| 362003        | 3722                    | " 10.150215   | 8.449                                    | -   |
| 361638        | 3723                    | " 10.891457   | 27.467                                   | -   |
| 361273        | <b>3724</b>             | " 10.632701   | 16.845                                   | -   |
| 360907        | 3725                    | " 10.373944   | 5.027                                    | -   |
| 360542        | 3726                    | " 10.115188   | 24.225                                   | -   |
| 360177        | 3727                    | " 10.856431   | 13.423                                   | -   |
| 359812        | <b>3728</b>             | " 10.597675   | 2.621                                    | -   |
| 359446        | 3729                    | " 10.338918   | 20.804                                   | -   |
| 359081        | 3730                    | " 10.080162   | 10.002                                   | -   |
| 358716        | 3731                    | " 10.821405   | 29.2                                     | -   |
| 358351        | <b>3732</b>             | " 10.562649   | 18.398                                   | -   |
| 357985        | 3733                    | " 10.303892   | 6.58                                     | -   |
| 357620        | 3734                    | " 10.045136   | 25.778                                   | -   |
| 357255        | 3735                    | " 10.786379   | 14.976                                   | -   |



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| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 356890     | <b>3736</b>          | Feb. 10.527623   | 4.174                           | -                                  |
| 356524     | 3737                 | " 10.268866  | 22.356                          | -                                  |
| 356159     | 3738                 | " 10.01011   | 11.554                          | -                                  |
| 355794     | 3739                 | " 10.751353  | 0.752                           | -                                  |
| 355429     | <b>3740</b>          | " 10.49259   | 19.95                           | -                                  |
| 355063     | 3741                 | " 10.233840  | 8.133                           | -                                  |
| 354697     | 3742                 | " 9.975084   | 26.315                          | -                                  |
| 354332     | 3743                 | " 9.716328   | 15.512                          | -                                  |
| 353967     | <b>3744</b>          | " 9.457571   | 4.71                            | -                                  |
| 353601     | 3745                 | " 9.198815   | 22.892                          | -                                  |
| 353236     | 3746                 | " 9.940058   | 12.09                           | -                                  |
| 352871     | 3747                 | " 9.681302   | 1.288                           | -                                  |
| 352506     | <b>3748</b>          | " 9.422545   | 20.486                          | -                                  |
| 352140     | 3749                 | " 9.163789   | 8.668                           | -                                  |
| 351775     | 3750                 | " 9.905032   | 27.866                          | -                                  |
| 351410     | 3751                 | " 9.646276   | 17.064                          | -                                  |
| 351045     | <b>3752</b>          | " 9.387519   | 6.262                           | -                                  |
| 350679     | 3753                 | " 9.128763   | 2.445                           | -                                  |
| 350314     | 3754                 | " 9.870006   | 13.642                          | -                                  |
| 349949     | 3755                 | " 9.61125  | 2.840                           | -                                  |
| 349584     | <b>3756</b>          | " 9.352493   | 22.038                          | -                                  |
| 349218     | 3757                 | " 9.093737   | 10.221                          | -                                  |
| 348853     | 3758                 | " 9.83498  | 29.419                          | -                                  |
| 348488     | 3759                 | " 9.576224   | 18.617                          | -                                  |
| 348123     | <b>3760</b>          | " 9.317467   | 7.815                           | -                                  |
| 347757     | 3761                 | " 9.058711   | 25.998                          | -                                  |
| 347392     | 3762                 | " 9.799954   | 15.196                          | -                                  |
| 347027     | 3763                 | " 9.541198   | 4.394                           | -                                  |
| 346662     | <b>3764</b>          | " 9.282441   | 23.592                          | -                                  |
| 346296     | 3765                 | " 9.023685   | 11.774                          | -                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 345931        | 3766                    | Feb. 9.764928   | 0.972                                    | -   |
| 345566        | 3767                    | " 9.506172  | 20.17                                    | -   |
| 345201        | <b>3768</b>             | " 9.247415  | 9.368                                    | -   |
| 344835        | 3769                    | " 9.988659  | 27.55                                    | -   |
| 344470        | 3770                    | " 9.729902  | 16.749                                   | -   |
| 344105        | 3771                    | " 9.471146  | 5.947                                    | -   |
| 343740        | <b>3772</b>             | " 9.212382  | 25.145                                   | -   |
| 343374        | 3773                    | " 9.955363  | 13.327                                   | -   |
| 343009        | 3774                    | " 9.694876  | 2.525                                    | -   |
| 342644        | 3775                    | " 9.43612   | 21.723                                   | -   |
| 342279        | <b>3776</b>             | " 9.177363  | 10.921                                   | -   |
| 341913        | 3777                    | " 9.918607  | 29.103                                   | -   |
| 341548        | 3778                    | " 9.65985   | 18.301                                   | -   |
| 341183        | 3779                    | " 9.401094  | 7.499                                    | -   |
| 340818        | <b>3780</b>             | " 9.142337  | 26.697                                   | -   |
| 340452        | 3781                    | " 9.883581  | 14.879                                   | -   |
| 340087        | 3782                    | " 9.624824  | 4.077                                    | -   |
| 339772        | 3783                    | " 9.366068  | 23.275                                   | -   |
| 339357        | <b>3784</b>             | " 9.107311  | 12.473                                   | -   |
| 338991        | 3785                    | " 9.84855   | 0.655                                    | -   |
| 338626        | 3786                    | " 9.589798  | 19.853                                   | -   |
| 338261        | 3787                    | " 9.331042  | 9.051                                    | -   |
| 337896        | <b>3788</b>             | " 9.072285  | 28.249                                   | -   |
| 337530        | 3789                    | " 9.813529  | 16.432                                   | -   |
| 337165        | 3790                    | " 9.554772  | 5.629                                    | -   |
| 336800        | 3791                    | " 9.296016  | 24.828                                   | -   |
| 336435        | <b>3792</b>             | " 9.037259  | 14.026                                   | -   |
| 336069        | 3793                    | " 9.778503  | 2.208                                    | -   |
| 335704        | 3794                    | " 9.519746  | 21.406                                   | -   |
| 335339        | 3795                    | " 9.26099   | 10.064                                   | -   |

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| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 334974        | <b>3796</b>          | Feb. 9.002233  | 29.802                          | -                                  |
| 334608        | 3797                 | " 9.743477   | 17.984                          | -                                  |
| 334243        | 3798                 | " 9.48472  | 7.182                           | -                                  |
| 333878        | 3799                 | " 9.225964   | 26.38                           | -                                  |
| 333513        | <b>3800</b>          | " 9.967207   | 15.578                          | -                                  |
| 333147        | 3801                 | " 9.708450   | 3.76                            | -                                  |
| 332782        | 3802                 | " 9.449694   | 22.958                          | -                                  |
| 332417        | 3803                 | " 9.190936   | 12.156                          | -                                  |
| 332052        | <b>3804</b>          | " 9.932181   | 1.354                           | -                                  |
| 331686        | 3805                 | " 9.673424   | 19.536                          | -                                  |
| 331321        | 3806                 | " 9.414668   | 8.734                           | -                                  |
| 330956        | 3807                 | " 9.155911   | 27.932                          | -                                  |
| 330591        | <b>3808</b>          | " 9.897155   | 17.13                           | -                                  |
| 330225        | 3809                 | " 9.638398   | 5.132                           | -                                  |
| 329860        | 3810                 | " 9.379642   | 24.51                           | -                                  |
| 329495        | 3811                 | " 9.120885   | 13.708                          | -                                  |
| 329130        | <b>3812</b>          | " 9.862129   | 2.906                           | -                                  |
| 328764        | 3813                 | " 9.603372   | 21.089                          | -                                  |
| 328399        | 3814                 | " 9.344616   | 10.287                          | -                                  |
| 328034        | 3815                 | " 9.085859   | 29.485                          | -                                  |
| 327669        | <b>3816</b>          | " 9.827103   | 18.682                          | -                                  |
| 327303        | 3817                 | " 9.568346   | 6.865                           | -                                  |
| 326938        | 3818                 | " 9.30959  | 26.063                          | -                                  |
| 326573        | 3819                 | " 9.050833   | 15.261                          | -                                  |
| 326208        | <b>3820</b>          | " 9.792077   | 4.459                           | -                                  |
| 325842        | 3821                 | " 9.533320   | 22.641                          | -                                  |
| 325477        | 3822                 | " 9.274564   | 11.839                          | -                                  |
| <b>325112</b> | <b>3823</b>          | " <b>9.015807</b>  | <b>1.037</b>                    | <b>Yes</b>                         |
| 324747        | 3824                 | " 9.757051   | 20.235                          | -                                  |
| 324381        | 3825                 | " 9.498294   | 8.417                           | -                                  |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 324016        | 3826                 | Feb. 9.239538  | 27.615                          | —                                  |
| 323651        | 3827                 | " 9.980781   | 16.814                          | —                                  |
| 323286        | <b>3828</b>          | " 9.722025   | 6.011                           | —                                  |
| 322920        | 3829                 | " 9.463268   | 24.194                          | —                                  |
| 322555        | 3830                 | " 9.204512   | 13.392                          | —                                  |
| 322190        | 3831                 | " 9.945755   | 2.59                            | —                                  |
| 321825        | <b>3832</b>          | " 9.686999   | 21.788                          | —                                  |
| 321459        | 3833                 | " 9.428242   | 9.97                            | —                                  |
| 321094        | 3834                 | " 9.169486   | 29.168                          | —                                  |
| 320729        | 3835                 | " 9.910729   | 18.366                          | —                                  |
| 320364        | <b>3836</b>          | " 9.651973   | 7.564                           | —                                  |
| 319998        | 3837                 | " 9.393316   | 25.746                          | —                                  |
| 319633        | 3838                 | " 9.13446  | 14.944                          | —                                  |
| 319267        | 3839                 | " 8.875704   | 3.124                           | —                                  |
| 318902        | <b>3840</b>          | " 8.616947   | 22.324                          | —                                  |
| 318536        | 3841                 | " 8.358191   | 10.506                          | —                                  |
| 318171        | 3842                 | " 8.099434   | 29.704                          | —                                  |
| 317806        | 3843                 | " 8.840678   | 18.902                          | —                                  |
| 317441        | <b>3844</b>          | " 8.581921   | 8.1                             | —                                  |
| 317075        | 3845                 | " 8.323165   | 26.282                          | —                                  |
| 316710        | 3846                 | " 8.064408   | 15.48                           | —                                  |
| 316345        | 3847                 | " 8.805652   | 4.678                           | —                                  |
| 315980        | <b>3848</b>          | " 8.546895   | 23.876                          | —                                  |
| 315614        | 3849                 | " 8.288139   | 12.058                          | —                                  |
| <b>315249</b> | <b>3850</b>          | " <b>8.029382</b>  | <b>1.257</b>                    | <b>Yes</b>                         |
| 314884        | 3851                 | " 8.770626   | 20.455                          | —                                  |
| 314519        | <b>3852</b>          | " 8.511869   | 9.6                             | —                                  |
| 314153        | 3853                 | " 8.253113   | 27.835                          | —                                  |
| 313788        | 3854                 | " 8.994356   | 17.032                          | —                                  |
| 313423        | 3855                 | " 8.7356   | 6.231                           | —                                  |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 313058        | <b>3856</b>          | Feb. 8.476843  | 25.429                          | —                                  |
| 312692        | 3857                 | " 8.218087   | 13.611                          | —                                  |
| 312327        | 3858                 | " 8.95933  | 2.809                           | —                                  |
| 311962        | 3859                 | " 8.700574   | 22.007                          | —                                  |
| 311597        | <b>3860</b>          | " 8.441817   | 11.205                          | —                                  |
| 311231        | 3861                 | " 8.183061   | 29.388                          | —                                  |
| 310866        | 3862                 | " 8.924304   | 18.586                          | —                                  |
| 310501        | 3863                 | " 8.665548   | 7.784                           | —                                  |
| 310136        | <b>3864</b>          | " 8.406791   | 26.982                          | —                                  |
| 309770        | 3865                 | " 8.148035   | 15.164                          | —                                  |
| 309405        | 3866                 | " 8.889278   | 4.362                           | —                                  |
| 309040        | 3867                 | " 8.630522   | 23.56                           | —                                  |
| 308675        | <b>3868</b>          | " 8.371765   | 12.758                          | —                                  |
| <b>308309</b> | <b>3869</b>          | " <b>8.113009</b>  | <b>00.94</b>                    | <b>Yes</b>                         |
| 307944        | 3870                 | " 8.854252   | 20.139                          | —                                  |
| 307579        | 3871                 | " 8.595496   | 9.337                           | —                                  |
| 307214        | <b>3872</b>          | " 8.336739   | 28.535                          | —                                  |
| 306848        | 3873                 | " 8.077983   | 16.717                          | —                                  |
| 306483        | 3874                 | " 8.819226   | 5.915                           | —                                  |
| 306118        | 3875                 | " 8.56047  | 25.113                          | —                                  |
| 305753        | <b>3876</b>          | " 8.301713   | 14.311                          | —                                  |
| <b>305387</b> | <b>3877</b>          | " <b>8.042957</b>  | <b>2.493</b>                    | <b>Yes</b>                         |
| 305022        | 3878                 | " 8.7842   | 21.691                          | —                                  |
| 304657        | 3879                 | " 8.525448   | 10.89                           | —                                  |
| 304292        | <b>3880</b>          | " 8.266687   | 0.087                           | —                                  |
| 303926        | 3881                 | " 8.007931   | 18.267                          | —                                  |
| 303561        | 3882                 | " 8.749174   | 7.465                           | —                                  |
| 303196        | 3883                 | " 8.490418   | 26.663                          | —                                  |
| 302831        | <b>3884</b>          | " 8.231661   | 15.861                          | —                                  |
| 302465        | 3885                 | " 8.972955   | 4.043                           | —                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 302100        | 3886                    | Feb. 8.714148   | 23.241                                   | —   |
| 301735        | 3887                    | " 8.455392  | 12.439                                   | —   |
| <b>301370</b> | <b>3888</b>             | " <b>8.196635</b>   | <b>1.637</b>                             | <b>Yes</b>                                    |
| 301004        | 3889                    | " 8.937879  | 19.819                                   | —   |
| 300639        | 3890                    | " 8.679122  | 9.017                                    | —   |
| 300274        | 3891                    | " 8.420366  | 28.215                                   | —   |
| 299909        | <b>3892</b>             | " 8.161609  | 17.413                                   | —   |
| 299543        | 3893                    | " 8.902853  | 5.596                                    | —   |
| 299178        | 3894                    | " 8.644096  | 24.794                                   | —   |
| 298813        | 3895                    | " 8.38534   | 13.992                                   | —   |
| 298448        | <b>3896</b>             | " 8.126583  | 3.189                                    | —   |
| 298082        | 3897                    | " 8.867826  | 21.372                                   | —   |
| 297717        | 3898                    | " 8.60907   | 10.57                                    | —   |
| 297352        | 3899                    | " 8.350313  | 29.768                                   | —   |
| 296987        | <b>3900</b>             | " 8.091557  | 18.966                                   | —   |
| 296621        | 3901                    | " 8.832800  | 7.149                                    | —   |
| 296256        | 3902                    | " 8.574044  | 26.347                                   | —   |
| 295891        | 3903                    | " 8.316287  | 15.545                                   | —   |
| 295526        | <b>3904</b>             | " 8.056531  | 4.743                                    | —   |
| 295160        | 3905                    | " 8.797774  | 22.925                                   | —   |
| 294795        | 3906                    | " 8.539018  | 12.193                                   | —   |
| 294430        | 3907                    | " 8.280261  | 1.321                                    | —   |
| 294065        | <b>3908</b>             | " 8.021505  | 20.52                                    | —   |
| 293699        | 3909                    | " 8.762748  | 8.701                                    | —   |
| 293334        | 3910                    | " 8.503992  | 27.889                                   | —   |
| 292969        | 3911                    | " 8.245235  | 17.018                                   | —   |
| 292604        | <b>3912</b>             | " 8.986479  | 6.296                                    | —   |
| 292238        | 3913                    | " 8.727722  | 24.478                                   | —   |
| 291873        | 3914                    | " 8.468966  | 13.676                                   | —   |
| 291508        | 3915                    | " 8.210209  | 2.874                                    | —   |

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|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 291143     | <b>3916</b>          | Feb. 8.951453  | 22.0722                         | —                                  |
| 290777     | 3917                 | " 8.692696   | 10.254                          | —                                  |
| 290412     | 3918                 | " 8.43394  | 29.452                          | —                                  |
| 290047     | 3919                 | " 8.175183   | 18.65                           | —                                  |
| 289682     | <b>3920</b>          | " 8.916427   | 7.848                           | —                                  |
| 289316     | 3921                 | " 8.657670   | 26.022                          | —                                  |
| 288951     | 3922                 | " 8.398914   | 15.22                           | —                                  |
| 288586     | 3923                 | " 8.140157   | 4.418                           | —                                  |
| 288221     | <b>3924</b>          | " 8.881401   | 23.616                          | —                                  |
| 287855     | 3925                 | " 8.622644   | 11.798                          | —                                  |
| 287490     | 3926                 | " 8.363888   | 0.996                           | —                                  |
| 287125     | 3927                 | " 8.105131   | 20.194                          | —                                  |
| 286760     | <b>3928</b>          | " 8.846375   | 9.392                           | —                                  |
| 286394     | 3929                 | " 8.587618   | 27.574                          | —                                  |
| 286029     | 3930                 | " 8.328862   | 16.722                          | —                                  |
| 285664     | 3931                 | " 8.070105   | 5.97                            | —                                  |
| 285299     | <b>3932</b>          | " 8.811349   | 25.168                          | —                                  |
| 284933     | 3933                 | " 8.552592   | 13.35                           | —                                  |
| 284568     | 3934                 | " 8.293836   | 2.548                           | —                                  |
| 284203     | 3935                 | " 8.035079   | 21.746                          | —                                  |
| 283837     | <b>3936</b>          | " 7.776323   | 9.928                           | —                                  |
| 283471     | 3937                 | " 7.517567   | 28.11                           | —                                  |
| 283106     | 3938                 | " 7.25881  | 17.308                          | —                                  |
| 282741     | 3939                 | " 7.000054   | 6.506                           | —                                  |
| 282376     | <b>3940</b>          | " 7.741297   | 25.72                           | —                                  |
| 282010     | 3941                 | " 7.482541   | 13.902                          | —                                  |
| 281645     | 3942                 | " 7.223754   | 3.1                             | —                                  |
| 281280     | 3943                 | " 7.965028   | 22.298                          | —                                  |
| 280915     | <b>3944</b>          | " 7.706271   | 11.496                          | —                                  |
| 280549     | 3945                 | " 7.447515   | 29.678                          | —                                  |

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|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 280184        | 3946                    | Feb. 7.188758   | 18.876                                   | —  |
| 279819        | 3947                    | " 7.930   | 8.074                                    | —  |
| 279454        | <b>3948</b>             | " 7.671245  | 27.272                                   | —  |
| 279088        | 3949                    | " 7.412489  | 15.454                                   | —  |
| 278723        | 3950                    | " 7.153752  | 4.652                                    | —  |
| 278358        | 3951                    | " 7.894976  | 23.85                                    | —  |
| 277993        | <b>3952</b>             | " 7.636219  | 13.048                                   | —  |
| 277627        | 3953                    | " 7.377463  | 1.231                                    | —  |
| 277262        | 3954                    | " 7.118706  | 20.429                                   | —  |
| 276897        | 3955                    | " 7.85995   | 9.627                                    | —  |
| 276532        | <b>3956</b>             | " 7.601193  | 28.825                                   | —  |
| 276166        | 3957                    | " 7.342437  | 17.007                                   | —  |
| 275801        | 3958                    | " 7.08368   | 6.205                                    | —  |
| 275436        | 3959                    | " 7.824924  | 25.402                                   | —  |
| 275071        | <b>3960</b>             | " 7.566167  | 14.601                                   | —  |
| 274705        | 3961                    | " 7.307411  | 2.772                                    | —  |
| 274340        | 3962                    | " 7.048654  | 21.97                                    | —  |
| 273975        | 3963                    | " 7.789898  | 11.168                                   | —  |
| 273610        | <b>3964</b>             | " 7.531141  | 0.366                                    | —  |
| 273244        | 3965                    | " 7.272385  | 18.548                                   | —  |
| 272879        | 3966                    | " 7.013628  | 7.746                                    | —  |
| 272514        | 3967                    | " 7.754872  | 26.944                                   | —  |
| 272149        | <b>3968</b>             | " 7.496115  | 16.142                                   | —  |
| 271783        | 3969                    | " 7.237359  | 4.326                                    | —  |
| 271418        | 3970                    | " 7.978602  | 23.522                                   | —  |
| 271053        | 3971                    | " 7.719846  | 12.721                                   | —  |
| 270688        | <b>3972</b>             | " 7.461089  | 1.919                                    | —  |
| 270322        | 3973                    | " 7.202333  | 20.1                                     | —  |
| 269957        | 3974                    | " 7.943576  | 9.299                                    | —  |
| 269592        | 3975                    | " 7.68482   | 28.497                                   | —  |



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| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 269227     | <b>3976</b>          | Feb. 7.426063  | 17.695                          | —                                  |
| 268861     | 3977                 | " 7.167307   | 5.877                           | —                                  |
| 268496     | 3978                 | " 7.90855  | 25.075                          | —                                  |
| 268131     | 3979                 | " 7.649794   | 14.273                          | —                                  |
| 267766     | <b>3980</b>          | " 7.391037   | 3.471                           | —                                  |
| 267400     | 3981                 | " 7.132281   | 21.67                           | —                                  |
| 267035     | 3982                 | " 7.873524   | 10.87                           | —                                  |
| 266670     | 3983                 | " 7.614768   | 0.068                           | —                                  |
| 266305     | <b>3984</b>          | " 7.356011   | 19.266                          | —                                  |
| 265939     | 3985                 | " 7.097255   | 7.448                           | —                                  |
| 265574     | 3986                 | " 7.838498   | 26.646                          | —                                  |
| 265209     | 3987                 | " 7.579742   | 15.844                          | —                                  |
| 264844     | <b>3988</b>          | " 7.320985   | 5.042                           | —                                  |
| 264478     | 3989                 | " 7.062225   | 23.225                          | —                                  |
| 264113     | 3990                 | " 7.803472   | 12.422                          | —                                  |
| 263748     | 3991                 | " 7.544716   | 1.621                           | —                                  |
| 263383     | <b>3992</b>          | " 7.285959   | 20.819                          | —                                  |
| 263017     | 3993                 | " 7.027203   | 9.0                             | —                                  |
| 262652     | 3994                 | " 7.768446   | 28.199                          | —                                  |
| 262287     | 3995                 | " 7.509689   | 17.397                          | —                                  |
| 261922     | <b>3996</b>          | " 7.250933   | 6.595                           | —                                  |
| 261556     | 3997                 | " 7.992176   | 24.776                          | —                                  |
| 261191     | 3998                 | " 7.73342  | 13.975                          | —                                  |
| 260826     | 3999                 | " 7.474663   | 3.172                           | —                                  |
| 260461     | <b>4000</b>          | " 7.215907   | 22.371                          | —                                  |
| 260095     | 4001                 | " 7.95715  | 10.54                           | —                                  |
| 259730     | 4002                 | " 7.698394   | 29.74                           | —                                  |
| 259365     | 4003                 | " 7.439637   | 18.94                           | —                                  |
| 259000     | <b>4004</b>          | " 7.180881   | 8.14                            | —                                  |

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| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 258634        | 4005                    | Feb. 7.922124   | 26.32                                    | —  |
| 258269        | 4006                    | " 7.663368  | 15.52                                    | —  |
| 257904        | 4007                    | " 7.404611  | 4.71                                     | —  |
| 257539        | <b>4008</b>             | " 7.145855  | 23.91                                    | —  |
| 257173        | 4009                    | " 7.887098  | 12.09                                    | —  |
| 256808        | 4010                    | " 7.628342  | 1.29                                     | —  |
| 256443        | 4011                    | " 7.369585  | 20.49                                    | —  |
| 256078        | <b>4012</b>             | " 7.110829  | 9.69                                     | —  |
| 255712        | 4013                    | " 7.852072  | 27.89                                    | —  |
| 255347        | 4014                    | " 7.593316  | 17.07                                    | —  |
| 254982        | 4015                    | " 7.334559  | 6.27                                     | —  |
| 254617        | <b>4016</b>             | " 7.075803  | 25.46                                    | —  |
| 254251        | 4017                    | " 7.817046  | 13.65                                    | —  |
| 253886        | 4018                    | " 7.55829   | 2.84                                     | —  |
| 253521        | 4019                    | " 7.299533  | 22.04                                    | —  |
| 253156        | <b>4020</b>             | " 7.040777  | 11.23                                    | —  |
| 252790        | 4021                    | " 7.78202   | 29.42                                    | —  |
| 252425        | 4022                    | " 7.523264  | 18.62                                    | —  |
| 252060        | 4023                    | " 7.264507  | 7.82                                     | —  |
| 251695        | <b>4024</b>             | " 7.005751  | 27.02                                    | —  |
| 251329        | 4025                    | " 7.746994  | 15.2                                     | —  |
| 250964        | 4026                    | " 7.488237  | 4.4                                      | —  |
| 250599        | 4027                    | " 7.229481  | 23.6                                     | —  |
| 250234        | <b>4028</b>             | " 7.970245  | 12.8                                     | —  |
| 249868        | 4029                    | " 7.711968  | 0.98                                     | —  |
| 249503        | 4030                    | " 7.453211  | 20.77                                    | —  |
| 249138        | 4031                    | " 7.194455  | 9.37                                     | —  |
| 248773        | <b>4032</b>             | " 7.935699  | 28.57                                    | —  |
| 248407        | 4033                    | " 7.676942  | 16.75                                    | —  |
| 248042        | 4034                    | " 7.418186  | 5.95                                     | —  |

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| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 247677        | 4035                    | Feb. 7.159429   | 25.15                                    | —  |
| 247312        | <b>4036</b>             | " 7.900673  | 14.35                                    | —  |
| 246946        | 4037                    | " 7.641916  | 2.53                                     | —  |
| 246581        | 4038                    | " 7.38316   | 21.72                                    | —  |
| 246216        | 4039                    | " 7.124403  | 10.92                                    | —  |
| 245851        | <b>4040</b>             | " 7.865647  | 0.13                                     | —  |
| 245485        | 4041                    | " 7.60689   | 18.31                                    | —  |
| 245120        | 4042                    | " 7.348134  | 7.51                                     | —  |
| 244755        | 4043                    | " 7.089377  | 26.71                                    | —  |
| 244390        | <b>4044</b>             | " 7.830621  | 15.91                                    | —  |
| 244024        | 4045                    | " 7.571864  | 4.1                                      | —  |
| 243659        | 4046                    | " 7.313108  | 23.29                                    | —  |
| 243294        | 4047                    | " 7.054351  | 12.49                                    | —  |
| 242929        | <b>4048</b>             | " 7.795595  | 1.7                                      | —  |
| 242563        | 4049                    | " 7.536838  | 19.87                                    | —  |
| 242198        | 4050                    | " 7.278082  | 9.07                                     | —  |
| 241833        | 4051                    | " 7.019325  | 28.27                                    | —  |
| 241468        | <b>4052</b>             | " 7.760569  | 17.47                                    | —  |
| 241102        | 4053                    | " 7.501812  | 5.65                                     | —  |
| 240737        | 4054                    | " 7.243056  | 24.85                                    | —  |
| 240372        | 4055                    | " 7.984299  | 14.04                                    | —  |
| 240007        | <b>4056</b>             | " 7.725543  | 3.24                                     | —  |
| 239641        | 4057                    | " 7.466786  | 21.42                                    | —  |
| 239276        | 4058                    | " 7.20803   | 10.62                                    | —  |
| 238911        | 4059                    | " 7.949273  | 29.92                                    | —  |
| 238546        | <b>4060</b>             | " 7.690517  | 19.01                                    | —  |
| 238180        | 4061                    | " 7.43176   | 7.2                                      | —  |
| 237815        | 4062                    | " 7.173004  | 26.4                                     | —  |
| 237450        | 4063                    | " 7.914247  | 15.6                                     | —  |
| 237085        | <b>4064</b>             | " 7.655491  | 4.79                                     | —  |

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|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 236719        | 4065                    | Feb. 7.396734   | 22.98                                    | —  |
| 236354        | 4066                    | " 7.137978  | 12.18                                    | —  |
| 235989        | 4067                    | " 7.879221  | 1.37                                     | —  |
| 235624        | <b>4068</b>             | " 7.620465  | 20.57                                    | —  |
| 235258        | 4069                    | " 7.361708  | 8.75                                     | —  |
| 234893        | 4070                    | " 7.102952  | 27.95                                    | —  |
| 234528        | 4071                    | " 7.844195  | 17.15                                    | —  |
| 234163        | <b>4072</b>             | " 7.585439  | 6.35                                     | —  |
| 233797        | 4073                    | " 7.326682  | 24.53                                    | —  |
| 233432        | 4074                    | " 7.067926  | 13.73                                    | —  |
| 233067        | 4075                    | " 7.809169  | 2.93                                     | —  |
| 232702        | <b>4076</b>             | " 7.550413  | 22.12                                    | —  |
| 232336        | 4077                    | " 7.291656  | 10.31                                    | —  |
| 231971        | 4078                    | " 7.032900  | 29.5                                     | —  |
| 231606        | 4079                    | " 7.774143  | 18.7                                     | —  |
| 231241        | <b>4080</b>             | " 7.515387  | 7.87                                     | —  |
| 230875        | 4081                    | " 7.256630  | 26.08                                    | —  |
| 230510        | 4082                    | " 7.997874  | 15.25                                    | —  |
| 230145        | 4083                    | " 7.739117  | 4.48                                     | —  |
| 229780        | <b>4084</b>             | " 7.480361  | 23.68                                    | —  |
| 229414        | 4085                    | " 7.221604  | 11.86                                    | —  |
| 229049        | 4086                    | " 7.962848  | 1.06                                     | —  |
| 228684        | 4087                    | " 7.704091  | 20.24                                    | —  |
| 228319        | <b>4088</b>             | " 7.445335  | 9.45                                     | —  |
| 227953        | 4089                    | " 7.186578  | 27.64                                    | —  |
| 227588        | 4090                    | " 7.927821  | 16.83                                    | —  |
| 227223        | 4091                    | " 7.669065  | 6.03                                     | —  |
| 226858        | <b>4092</b>             | " 7.410308  | 25.23                                    | —  |
| 226492        | 4093                    | " 7.151552  | 13.41                                    | —  |
| 226127        | 4094                    | " 7.892795  | 2.61                                     | —  |

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|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 225762        | 4095                 | Feb. 7.634039  | 21.80                           | —                                  |
| 225397        | <b>4096</b>          | " 7.375282   | 11.0                            | —                                  |
| 225031        | 4097                 | " 7.116526   | 29.19                           | —                                  |
| 224666        | 4098                 | " 7.857769   | 18.39                           | —                                  |
| 224301        | 4099                 | " 7.599013   | 7.58                            | —                                  |
| 223936        | <b>4100</b>          | " 7.340256   | 26.77                           | —                                  |
| 223570        | 4101                 | " 7.081500   | 14.95                           | —                                  |
| 223205        | 4102                 | " 7.822744   | 4.15                            | —                                  |
| 222840        | 4103                 | " 7.563987   | 23.35                           | —                                  |
| 222475        | <b>4104</b>          | " 7.305231   | 12.55                           | —                                  |
| <b>222109</b> | <b>4105</b>          | " <b>7.046474</b>  | <b>0.73</b>                     | <b>Yes</b>                         |
| 221744        | 4106                 | " 7.787718   | 19.93                           | —                                  |
| 221379        | 4107                 | " 7.528961   | 9.13                            | —                                  |
| 221014        | <b>4108</b>          | " 7.270205   | 28.33                           | —                                  |
| 220648        | 4109                 | " 7.011448   | 16.51                           | —                                  |
| 220283        | 4110                 | " 7.752692   | 5.71                            | —                                  |
| 219918        | 4111                 | " 7.493935   | 24.9                            | —                                  |
| 219553        | <b>4112</b>          | " 7.235179   | 14.1                            | —                                  |
| 219187        | 4113                 | " 7.976422   | 2.28                            | —                                  |
| 218822        | 4114                 | " 7.717666   | 21.48                           | —                                  |
| 218457        | 4115                 | " 7.458909   | 10.68                           | —                                  |
| 218092        | <b>4116</b>          | " 7.200153   | 29.88                           | —                                  |
| 217726        | 4117                 | " 7.941396   | 18.09                           | —                                  |
| 217361        | 4118                 | " 7.682639   | 7.26                            | —                                  |
| 216996        | 4119                 | " 7.423883   | 26.46                           | —                                  |
| 216631        | <b>4120</b>          | " 7.165126   | 15.64                           | —                                  |
| 216265        | 4121                 | " 7.906370   | 3.82                            | —                                  |
| 215900        | 4122                 | " 7.647613   | 23.02                           | —                                  |
| 215535        | 4123                 | " 7.388857   | 12.2                            | —                                  |
| <b>215170</b> | <b>4124</b>          | " <b>7.130100</b>  | <b>1.42</b>                     | <b>Yes</b>                         |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 214804        | 4125                 | Feb. 7.871344  | 19.6                            | —                                  |
| 214439        | 4126                 | " 7.612587   | 8.8                             | —                                  |
| 214074        | 4127                 | " 7.353831   | 28.0                            | —                                  |
| 213709        | <b>4128</b>          | " 7.095075   | 17.19                           | —                                  |
| 213342        | 4129                 | " 6.836318   | 4.36                            | —                                  |
| 212977        | 4130                 | " 6.577562   | 23.55                           | —                                  |
| 212612        | 4131                 | " 6.318805   | 12.75                           | —                                  |
| 212247        | <b>4132</b>          | " 6.060049   | 1.95                            | —                                  |
| 211881        | 4133                 | " 6.801292   | 20.13                           | —                                  |
| 211516        | 4134                 | " 6.542536   | 9.33                            | —                                  |
| 211151        | 4135                 | " 6.283779   | 28.54                           | —                                  |
| 210786        | <b>4136</b>          | " 6.025023   | 17.74                           | —                                  |
| 210420        | 4137                 | " 6.766266   | 5.92                            | —                                  |
| 210055        | 4138                 | " 6.50751  | 25.12                           | —                                  |
| 209690        | 4139                 | " 6.248753   | 14.32                           | —                                  |
| 209325        | <b>4140</b>          | " 6.989997   | 3.52                            | —                                  |
| 208959        | 4141                 | " 6.73124  | 21.7                            | —                                  |
| 208594        | 4142                 | " 6.472484   | 10.9                            | —                                  |
| <b>208229</b> | <b>4143</b>          | " <b>6.213727</b>  | <b>0.098</b>                    | <b>Yes</b>                         |
| 207864        | <b>4144</b>          | " 6.954971   | 19.3                            | —                                  |
| 207498        | 4145                 | " 6.696214   | 7.48                            | —                                  |
| 207133        | 4146                 | " 6.437458   | 26.65                           | —                                  |
| 206768        | 4147                 | " 6.178701   | 15.88                           | —                                  |
| 206403        | <b>4148</b>          | " 6.919943   | 5.08                            | —                                  |
| 206037        | 4149                 | " 6.661188   | 23.26                           | —                                  |
| 205672        | 4150                 | " 6.402432   | 12.43                           | —                                  |
| <b>205307</b> | <b>4151</b>          | " <b>6.143675</b>  | <b>1.63</b>                     | <b>Yes</b>                         |
| 204942        | <b>4152</b>          | " 6.884913   | 20.86                           | —                                  |
| 204576        | 4153                 | " 6.626162   | 9.04                            | —                                  |
| 204211        | 4154                 | " 6.367406   | 28.24                           | —                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investigation |
|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 203846        | 4155                    | Feb 6.108649  | 17.44                                    | —  |
| 203481        | <b>4156</b>             | " 6.849893  | 6.64                                     | —  |
| 203115        | 4157                    | " 6.591136  | 24.82                                    | —  |
| 202750        | 4158                    | " 6.332380  | 13.02                                    | —  |
| 202385        | 4159                    | " 6.073623  | 3.21                                     | —  |
| 202020        | <b>4160</b>             | " 6.814867  | 22.39                                    | —  |
| 201654        | 4161                    | " 6.556110  | 10.59                                    | —  |
| 201289        | 4162                    | " 6.297354  | 29.77                                    | —  |
| 200924        | 4163                    | " 6.038597  | 18.91                                    | —  |
| 200559        | <b>4164</b>             | " 6.779841  | 8.17                                     | —  |
| 200193        | 4165                    | " 6.521084  | 26.34                                    | —  |
| 199828        | 4166                    | " 6.262328  | 15.55                                    | —  |
| 199463        | 4167                    | " 6.003571  | 4.74                                     | —  |
| 199098        | <b>4168</b>             | " 6.744815  | 23.94                                    | —  |
| 198732        | 4169                    | " 6.486058  | 12.12                                    | —  |
| <b>198367</b> | <b>4170</b>             | <b>6.227302</b>   | <b>1.32</b>                              | <b>Yes</b>                               |
| 198002        | 4171                    | " 6.968545  | 20.52                                    | —  |
| 197637        | <b>4172</b>             | " 6.708789  | 9.71                                     | —  |
| 197271        | 4173                    | " 6.451032  | 27.89                                    | —  |
| 196906        | 4174                    | " 6.192276  | 17.09                                    | —  |
| 196541        | 4175                    | " 6.933519  | 6.29                                     | —  |
| 196176        | <b>4176</b>             | " 6.674763  | 25.49                                    | —  |
| 195810        | 4177                    | " 6.416006  | 13.67                                    | —  |
| 195445        | 4178                    | " 6.15725   | 2.87                                     | —  |
| 195080        | 4179                    | " 6.898493  | 22.06                                    | —  |
| 194715        | <b>4180</b>             | " 6.639737  | 11.26                                    | —  |
| 194349        | 4181                    | " 6.380980  | 29.44                                    | —  |
| 193984        | 4182                    | " 6.122240  | 18.64                                    | —  |
| 193619        | 4183                    | " 6.863467  | 7.84                                     | —  |
| 193254        | <b>4184</b>             | " 6.604711  | 27.04                                    | —  |

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|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)  | (5)   |
| 192888        | 4185                    | Feb. 6.345954   | 15.22  | —   |
| 192523        | 4186                    | " 6.088719  | 4.42   | —   |
| 192158        | 4187                    | " 6.828441  | 23.61  | —   |
| 191793        | <b>4188</b>             | " 6.569684  | 12.81  | —   |
| 191427        | 4189                    | " 6.310928  | 0.99   | —   |
| 191062        | 4190                    | " 6.052171  | 20.19  | —   |
| 190697        | 4191                    | " 6.793415  | 9.39   | —   |
| 190332        | <b>4192</b>             | " 6.534658  | 28.59  | —   |
| 189966        | 4193                    | " 6.275902  | 16.77  | —   |
| 189601        | 4194                    | " 6.017145  | 5.97   | —   |
| 189236        | 4195                    | " 6.758389  | 25.07  | —   |
| 188871        | 4196                    | " 6.499632  | 14.37  | —   |
| <b>188505</b> | <b>4197</b>             | " <b>6.240876</b>   | <b>2.55</b>  | <b>Yes</b>                                    |
| 188140        | 4198                    | " 6.982119  | 21.75  | —   |
| 187775        | 4199                    | " 6.723369  | 10.94  | —   |
| 187410        | <b>4200</b>             | " 6.464606  | 0.16   | —   |
| 187044        | 4201                    | " 6.205850  | 18.28  | —   |
| 186679        | 4202                    | " 6.947094  | 7.48   | —   |
| 186314        | 4203                    | " 6.668337  | 26.68  | —   |
| 185949        | <b>4204</b>             | " 6.429580  | 15.88  | —   |
| 185583        | 4205                    | " 6.170824  | 4.06   | —   |
| 185218        | 4206                    | " 6.912068  | 23.26  | —   |
| 184853        | 4207                    | " 6.653311  | 12.46  | —   |
| 184488        | <b>4208</b>             | " 6.394555  | 1.66   | —   |
| 184122        | 4209                    | " 6.135798  | 19.84  | —   |
| 183757        | 4210                    | " 6.877042  | 9.04   | —   |
| 183392        | 4211                    | " 6.618285  | 28.23  | —   |
| 183027        | <b>4212</b>             | " 6.359529  | 17.43  | —   |
| 182661        | 4213                    | " 6.100772  | 5.61   | —   |
| 182296        | 4214                    | " 6.842016  | 24.81  | —   |



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| (1)        | (2)                  | (3)  | (4)                              | (5)                                |
| 181931     | 4215                 | Feb. 6.583259  | 14.01                            | —                                  |
| 181566     | <b>4216</b>          | " 6.324503   | 3.21                             | —                                  |
| 181200     | 4217                 | " 6.065746   | 21.39                            | —                                  |
| 180835     | 4218                 | " 6.806990   | 10.59                            | —                                  |
| 180470     | 4219                 | " 6.548233   | 29.79                            | —                                  |
| 180105     | <b>4220</b>          | " 6.289477   | 19.03                            | —                                  |
| 179739     | 4221                 | " 6.030720   | 7.21                             | —                                  |
| 179374     | 4222                 | " 6.771964   | 26.41                            | —                                  |
| 179009     | 4223                 | " 6.513207   | 15.61                            | —                                  |
| 178644     | <b>4224</b>          | " 6.254451   | 4.81                             | —                                  |
| 178277     | 4225                 | " 5.995694   | 21.97                            | —                                  |
| 177912     | 4226                 | " 5.736938   | 11.17                            | —                                  |
| 177547     | 4227                 | " 5.478181   | 0.37                             | —                                  |
| 177182     | <b>4228</b>          | " 5.219425   | 18.55                            | —                                  |
| 176816     | 4229                 | " 5.960668   | 7.75                             | —                                  |
| 176451     | 4230                 | " 5.701912   | 26.94                            | —                                  |
| 176086     | 4231                 | " 5.443155   | 16.14                            | —                                  |
| 175721     | <b>4232</b>          | " 5.184399   | 5.34                             | —                                  |
| 175355     | 4233                 | " 5.925642   | 23.52                            | —                                  |
| 174990     | 4234                 | " 5.666886   | 12.72                            | —                                  |
| 174625     | 4235                 | " 5.408129   | 1.91                             | —                                  |
| 174260     | <b>4236</b>          | " 5.149373   | 21.11                            | —                                  |
| 173894     | 4237                 | " 5.890616   | 9.29                             | —                                  |
| 173529     | 4238                 | " 5.631860   | 28.49                            | —                                  |
| 173164     | 4239                 | " 5.373103   | 17.69                            | —                                  |
| 172799     | <b>4240</b>          | " 5.114347   | 6.91                             | —                                  |
| 172433     | 4241                 | " 5.855590   | 25.09                            | —                                  |
| 172068     | 4242                 | " 5.596834   | 14.29                            | —                                  |
| 171703     | 4243                 | " 5.338077   | 3.49                             | —                                  |
| 171338     | <b>4244</b>          | " 5.079321   | 22.69                            | —                                  |

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|------------|-------------------------|---|--|--|
| (1)        | (2)                     | (3)   | (4)                                      | (5)                                      |
| 170972     | 4245                    | Feb. 5.820564   | 10.87                                    | —  |
| 170607     | 4246                    | " 5.561808  | 0.067                                    | —  |
| 170242     | 4247                    | " 5.303051  | 19.26                                    | —  |
| 169877     | <b>4248</b>             | " 5.044295  | 8.46                                     | —  |
| 169511     | 4249                    | " 5.785538  | 26.50                                    | —  |
| 169146     | 4250                    | " 5.526782  | 15.84                                    | —  |
| 168781     | 4251                    | " 5.268025  | 5.01                                     | —  |
| 168416     | <b>4252</b>             | " 5.009269  | 24.32                                    | —  |
| 168050     | 4253                    | " 5.750512  | 12.4                                     | —  |
| 167685     | 4254                    | " 5.491756  | 1.6                                      | —  |
| 167320     | 4255                    | " 5.232999  | 20.8                                     | —  |
| 166955     | <b>4256</b>             | " 5.974243  | 10.0                                     | —  |
| 166589     | 4257                    | " 5.715486  | 28.18                                    | —  |
| 166224     | 4258                    | " 5.45673   | 17.37                                    | —  |
| 165859     | 4259                    | " 5.197973  | 6.57                                     | —  |
| 165494     | <b>4260</b>             | " 5.939217  | 25.77                                    | —  |
| 165128     | 4261                    | " 5.680460  | 13.95                                    | —  |
| 164763     | 4262                    | " 5.421704  | 3.15                                     | —  |
| 164398     | 4263                    | " 5.162947  | 22.35                                    | —  |
| 164033     | <b>4264</b>             | " 5.904191  | 11.55                                    | —  |
| 163667     | 4265                    | " 5.645434  | 29.73                                    | —  |
| 163302     | 4266                    | " 5.386678  | 18.93                                    | —  |
| 162937     | 4267                    | " 5.127921  | 8.12                                     | —  |
| 162572     | <b>4268</b>             | " 5.869165  | 27.32                                    | —  |
| 162206     | 4269                    | " 5.610408  | 15.50                                    | —  |
| 161841     | 4270                    | " 5.351652  | 4.72                                     | —  |
| 161476     | 4271                    | " 5.092895  | 23.92                                    | —  |
| 161111     | <b>4272</b>             | " 5.834139  | 13.12                                    | —  |
| 160745     | 4273                    | " 5.575382  | 1.3                                      | —  |
| 160380     | 4274                    | " 5.316626  | 20.5                                     | —  |

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|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 160015        | 4275                    | Feb. 5.057869   | 9.69                                     | —   |
| 159650        | <b>4276</b>             | " 5.799113  | 28.9                                     | -   |
| 159284        | 4277                    | " 5.540356  | 17.07                                    | -   |
| 158919        | 4278                    | " 5.2816  | 6.27                                     | -   |
| 158554        | 4279                    | " 5.022843  | 25.47                                    | -   |
| 158189        | <b>4280</b>             | " 5.764087  | 14.67                                    | -   |
| 157823        | 4281                    | " 5.505333  | 2.86                                     | -   |
| 157458        | 4282                    | " 5.246574  | 22.06                                    | -   |
| 157093        | 4283                    | " 5.987817  | 11.25                                    | -   |
| 156728        | <b>4284</b>             | " 5.729060  | 0.45                                     | -   |
| 156362        | 4285                    | " 5.470304  | 18.63                                    | -   |
| 155997        | 4286                    | " 5.211547  | 7.83                                     | -   |
| 155632        | 4287                    | " 5.952791  | 27.03                                    | -   |
| 155267        | <b>4288</b>             | " 5.694033  | 16.23                                    | -   |
| 154901        | 4289                    | " 5.435278  | 4.41                                     | -   |
| 154536        | 4290                    | " 5.176521  | 23.59                                    | -   |
| 154171        | 4291                    | " 5.917765  | 12.78                                    | -   |
| 153806        | <b>4292</b>             | " 5.659008  | 1.99                                     | -   |
| 153440        | 4293                    | " 5.400252  | 20.17                                    | -   |
| 153075        | 4294                    | " 5.141495  | 9.37                                     | -   |
| 152710        | 4295                    | " 5.882739  | 28.56                                    | -   |
| 152345        | <b>4296</b>             | " 5.623982  | 17.76                                    | -   |
| 151979        | 4297                    | " 5.365226  | 5.94                                     | -   |
| 151614        | 4298                    | " 5.106459  | 25.14                                    | -   |
| 151249        | 4299                    | " 5.847713  | 14.34                                    | -   |
| 150884        | <b>4300</b>             | " 5.588956  | 3.55                                     | -   |
| 150518        | 4301                    | " 5.330200  | 21.73                                    | -   |
| 150153        | 4302                    | " 5.071444  | 10.93                                    | -   |
| 149788        | 4303                    | " 5.812687  | 0.13                                     | -   |
| 149423        | <b>4304</b>             | " 5.553931  | 19.34                                    | -   |

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|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 149057        | 4305                    | " 5.295174  | 7.59                                     | -   |
| 148692        | 4306                    | " 5.036418  | 26.77                                    | -   |
| 148327        | 4307                    | " 5.776661  | 15.97                                    | -   |
| 147962        | <b>4308</b>             | " 5.518905  | 5.16                                     | -   |
| 147596        | 4309                    | " 5.260148  | 23.34                                    | -   |
| 147231        | 4310                    | " 5.001592  | 12.46                                    | -   |
| 146866        | 4311                    | " 5.742635  | 1.66                                     | -   |
| 146501        | <b>4312</b>             | " 5.483879  | 20.86                                    | -   |
| 146135        | 4313                    | " 5.225122  | 9.03                                     | -   |
| 145770        | 4314                    | " 5.966366  | 28.24                                    | -   |
| 145405        | 4315                    | " 5.707609  | 17.44                                    | -   |
| 145040        | <b>4316</b>             | " 5.448853  | 6.64                                     | -   |
| 144674        | 4317                    | " 5.190096  | 24.72                                    | -   |
| 144309        | 4318                    | " 5.93134   | 14.02                                    | -   |
| 143944        | 4319                    | " 5.672583  | 3.22                                     | -   |
| 143579        | <b>4320</b>             | " 5.413827  | 22.42                                    | -   |
| 143213        | 4321                    | " 5.15507   | 10.6                                     | -   |
| 142847        | 4322                    | " 4.896314  | 28.78                                    | -   |
| 142482        | 4323                    | " 4.637557  | 17.99                                    | -   |
| 142117        | <b>4324</b>             | " 4.378801  | 7.18                                     | -   |
| 141751        | 4325                    | " 4.120044  | 25.37                                    | -   |
| 141386        | 4326                    | " 4.861288  | 14.56                                    | -   |
| 141021        | 4327                    | " 4.602531  | 3.76                                     | -   |
| 140656        | <b>4328</b>             | " 4.343775  | 22.96                                    | -   |
| 140290        | 4329                    | " 4.085018  | 11.14                                    | -   |
| 139925        | 4330                    | " 4.826262  | 0.34                                     | -   |
| 139560        | 4331                    | " 4.567505  | 19.53                                    | -   |
| 139195        | <b>4332</b>             | " 4.308749  | 8.73                                     | -   |
| 138829        | 4333                    | " 4.049992  | 26.91                                    | -   |
| 138464        | 4334                    | " 4.791236  | 16.11                                    | -   |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 138099        | 4335                    | " 4.543479  | 5.31                                     | -   |
| 137734        | <b>4336</b>             | " 4.273723  | <b>24.51</b>                             | -   |
| 137368        | 4337                    | " 4.014966  | <b>12.69</b>                             | -   |
| 137003        | 4338                    | " 4.756210  | 1.89                                     | -   |
| 136638        | 4339                    | " 4.497453  | 21.09                                    | -   |
| 136273        | <b>4340</b>             | " 4.238897  | 10.3                                     | -   |
| 135907        | 4341                    | " 4.979941  | 28.48                                    | -   |
| 135542        | 4342                    | " 4.721184  | 17.68                                    | -   |
| 135177        | 4343                    | " 4.462427  | 6.88                                     | -   |
| 134812        | <b>4344</b>             | " 4.203671  | 26.07                                    | -   |
| 134446        | 4345                    | " 4.944914  | 14.26                                    | -   |
| 134081        | 4346                    | " 4.686158  | 3.46                                     | -   |
| 133716        | 4347                    | " 4.427401  | 22.65                                    | -   |
| 133351        | <b>4348</b>             | " 4.168645  | 11.85                                    | -   |
| 132985        | 4349                    | " 4.909888  | 0.03                                     | -   |
| 132620        | 4350                    | " 4.651132  | 19.23                                    | -   |
| 132255        | 4351                    | " 4.392375  | 8.41                                     | -   |
| 131890        | <b>4352</b>             | " 4.133619  | 27.47                                    | -   |
| 131524        | 4353                    | " 4.874862  | 15.19                                    | -   |
| 131159        | 4354                    | " 4.616106  | 4.99                                     | -   |
| 130794        | 4355                    | " 4.357349  | 24.18                                    | -   |
| 130429        | <b>4356</b>             | " 4.098593  | 13.38                                    | -   |
| 130063        | 4357                    | " 4.839836  | 1.56                                     | -   |
| 129698        | 4358                    | " 4.581080  | 20.76                                    | -   |
| 129333        | 4359                    | " 4.322323  | 9.96                                     | -   |
| 128968        | <b>4360</b>             | " 4.063567  | 29.16                                    | -   |
| 128602        | 4361                    | " 4.804810  | 17.34                                    | -   |
| 128237        | 4362                    | " 4.546054  | 6.54                                     | -   |
| 127872        | 4363                    | " 4.287297  | 25.74                                    | -   |
| 127507        | <b>4364</b>             | " 4.028541  | 14.93                                    | -   |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 127141        | 4365                 | " 4.769784   | 3.12                            | -                                  |
| 126776        | 4366                 | " 4.511028   | 22.32                           | -                                  |
| 126411        | 4367                 | " 4.252271   | 11.51                           | -                                  |
| 126046        | <b>4368</b>          | " 4.993515   | 0.71                            | -                                  |
| 125680        | 4369                 | " 4.734758   | 18.89                           | -                                  |
| 125315        | 4370                 | " 4.476002   | 8.11                            | -                                  |
| 124950        | 4371                 | " 4.217245   | 27.31                           | -                                  |
| 124585        | <b>4372</b>          | " 4.958489   | 16.51                           | -                                  |
| 124219        | 4373                 | " 4.699732   | 4.69                            | -                                  |
| 123854        | 4374                 | " 4.440976   | 23.89                           | -                                  |
| 123489        | 4375                 | " 4.182219   | 13.08                           | -                                  |
| 123124        | <b>4376</b>          | " 4.923463   | 2.28                            | -                                  |
| 122758        | 4377                 | " 4.664706   | 20.46                           | -                                  |
| 122393        | 4378                 | " 4.405950   | 9.56                            | -                                  |
| 122028        | 4379                 | " 4.147193   | 28.86                           | -                                  |
| 121663        | <b>4380</b>          | " 4.888436   | 18.06                           | -                                  |
| 121297        | 4381                 | " 4.629680   | 6.24                            | -                                  |
| 120932        | 4382                 | " 4.370923   | 25.44                           | -                                  |
| 120567        | 4383                 | " 4.112167   | 14.64                           | -                                  |
| 120202        | <b>4384</b>          | " 4.853410   | 3.85                            | -                                  |
| 119836        | 4385                 | " 4.594654   | 22.01                           | -                                  |
| 119471        | 4386                 | " 4.335897   | 11.21                           | -                                  |
| <b>119106</b> | <b>4387</b>          | " <b>4.077141</b>  | <b>0.41</b>                     | <b>Yes</b>                         |
| 118741        | <b>4388</b>          | " 4.818345   | 19.61                           | -                                  |
| 118375        | 4389                 | " 4.559628   | 7.79                            | -                                  |
| 118010        | 4390                 | " 4.300871   | 26.98                           | -                                  |
| 117645        | 4391                 | " 4.042115   | 16.18                           | -                                  |
| 117280        | <b>4392</b>          | " 4.783358   | 5.38                            | -                                  |
| 116914        | 4393                 | " 4.524602   | 23.56                           | -                                  |
| 116549        | 4394                 | " 4.265845   | 12.76                           | -                                  |

| Julian Day    | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 116184        | <b>4395</b>          | " 4.001089   | 1.96                            | Yes                                |
| 115819        | <b>4396</b>          | " 4.748332   | 21.16                           | -                                  |
| 115453        | 4397                 | " 4.489576   | 9.34                            | -                                  |
| 115088        | 4398                 | " 4.230819   | 28.54                           | -                                  |
| 114723        | 4399                 | " 4.972063   | 17.74                           | -                                  |
| 114358        | <b>4400</b>          | " 4.713306   | 6.94                            | -                                  |
| 113992        | 4401                 | " 4.45455  | 25.12                           | -                                  |
| 113627        | 4402                 | " 4.195794   | 14.32                           | -                                  |
| 113262        | 4403                 | " 4.937037   | 3.52                            | -                                  |
| 112897        | <b>4404</b>          | " 4.678287   | 22.72                           | -                                  |
| 112531        | 4405                 | " 4.419524   | 10.9                            | -                                  |
| <b>112166</b> | <b>4406</b>          | " 4.160768   | 0.1                             | Yes                                |
| 111801        | 4407                 | " 4.902011   | 19.29                           | -                                  |
| 111436        | <b>4408</b>          | " 4.643255   | 8.49                            | -                                  |
| 111070        | 4409                 | " 4.384498   | 26.67                           | -                                  |
| 110705        | 4410                 | " 4.125742   | 15.87                           | -                                  |
| 110340        | 4411                 | " 4.866985   | 5.07                            | -                                  |
| 109975        | <b>4412</b>          | " 4.608229   | 24.27                           | -                                  |
| 109609        | 4413                 | " 4.349472   | 12.45                           | -                                  |
| <b>109244</b> | <b>4414</b>          | " 4.090716   | 1.65                            | Yes                                |
| 109879        | 4415                 | " 4.831595   | 20.85                           | -                                  |
| 108514        | <b>4416</b>          | " 4.573203   | 10.04                           | -                                  |
| 108148        | 4417                 | " 4.314446   | 28.23                           | -                                  |
| 107783        | 4418                 | " 4.055690   | 17.42                           | -                                  |
| 107417        | 4419                 | " 3.796933   | 5.60                            | -                                  |
| 107052        | <b>4420</b>          | " 3.538177   | 24.79                           | -                                  |
| 106686        | 4421                 | " 3.279420   | 12.98                           | -                                  |
| <b>106321</b> | <b>4422</b>          | " 3.020664   | 2.18                            | Yes                                |
| 105956        | 4423                 | " 3.761907   | 21.38                           | -                                  |
| 105591        | <b>4424</b>          | " 3.503151   | 10.58                           | -                                  |

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|---------------|----------------------|--|---------------------------------|------------------------------------|
| (1)           | (2)                  | (3)  | (4)                             | (5)                                |
| 105225        | 4425                 | " 3.244394   | 28.76                           | -                                  |
| 105860        | 4426                 | " 3.985638   | 17.96                           | -                                  |
| 104495        | 4427                 | " 3.726881   | 7.15                            | -                                  |
| 104130        | <b>4428</b>          | " 3.468105   | 26.35                           | -                                  |
| 103764        | 4429                 | " 3.209368   | 14.53                           | -                                  |
| 103399        | 4430                 | " 3.950612   | 3.73                            | -                                  |
| 103034        | 4431                 | " 3.691855   | 22.93                           | -                                  |
| 102669        | <b>4432</b>          | " 3.433099   | 12.13                           | -                                  |
| <b>102303</b> | <b>4433</b>          | " <b>3.174342</b>  | <b>0.31</b>                     | <b>Yes</b>                         |
| 101938        | 4434                 | " 3.915586   | 19.51                           | -                                  |
| 101573        | 4435                 | " 3.656829   | 8.71                            | -                                  |
| 101208        | <b>4436</b>          | " 3.398073   | 27.9                            | -                                  |
| 100842        | 4437                 | " 3.139316   | 16.09                           | -                                  |
| 100477        | 4438                 | " 3.880560   | 5.29                            | -                                  |
| 100112        | 4439                 | " 3.621803   | 24.48                           | -                                  |
| 99747         | <b>4440</b>          | " 3.363047   | 13.66                           | -                                  |
| <b>99381</b>  | <b>4441</b>          | " <b>3.104290</b>  | <b>1.84</b>                     | <b>Yes</b>                         |
| 99016         | 4442                 | " 3.845434   | 21.04                           | -                                  |
| 98651         | 4443                 | " 3.586777   | 10.24                           | -                                  |
| 98286         | <b>4444</b>          | " 3.328021   | 29.44                           | -                                  |
| 97920         | 4445                 | " 3.069264   | 17.62                           | -                                  |
| 97555         | 4446                 | " 3.810508   | 6.82                            | -                                  |
| 97190         | 4447                 | " 3.551751   | 26.01                           | -                                  |
| 96825         | <b>4448</b>          | " 3.292995   | 15.21                           | -                                  |
| 96459         | 4449                 | " 3.034238   | 3.39                            | -                                  |
| 96094         | 4450                 | " 3.775482   | 22.59                           | -                                  |
| 95729         | 4451                 | " 3.516725   | 11.8                            | -                                  |
| 95364         | <b>4452</b>          | " 3.257969   | 00.998                          | -                                  |
| 94998         | 4453                 | " 3.999212   | 19.18                           | -                                  |
| 94633         | 4454                 | " 3.740456   | 8.38                            | -                                  |



| Julian Day   | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|--------------|----------------------|--|---------------------------------|------------------------------------|
| (1)          | (2)                  | (3)  | (4)                             | (5)                                |
| 94268        | 4455                 | " 3.481699   | 27.58                           | -                                  |
| 93903        | <b>4456</b>          | " 3.222943   | 16.77                           | -                                  |
| 93537        | 4457                 | " 3.964186   | 4.96                            | -                                  |
| 93172        | 4458                 | " 3.705430   | 24.15                           | -                                  |
| 92807        | 4459                 | " 3.446673   | 13.35                           | -                                  |
| <b>92442</b> | <b>4460</b>          | " <b>3.187917</b>  | <b>2.55</b>                     | <b>Yes</b>                         |
| 92076        | 4461                 | " 3.929160   | 20.73                           | -                                  |
| 91711        | 4462                 | " 3.670404   | 9.93                            | -                                  |
| 91346        | 4463                 | " 3.411646   | 29.13                           | -                                  |
| 90981        | <b>4464</b>          | " 3.152891   | 18.33                           | -                                  |
| 90615        | 4465                 | " 3.894134   | 6.51                            | -                                  |
| 90250        | 4466                 | " 3.635378   | 25.71                           | -                                  |
| 89885        | 4467                 | " 3.376621   | 14.90                           | -                                  |
| 89520        | <b>4468</b>          | " 3.117860   | 4.7                             | -                                  |
| 89154        | 4469                 | " 3.859108   | 22.28                           | -                                  |
| 88789        | 4470                 | " 3.600352   | 11.5                            | -                                  |
| 88424        | 4471                 | " 3.341595   | 0.68                            | -                                  |
| 88059        | <b>4472</b>          | " 3.082839   | 19.88                           | -                                  |
| 87693        | 4473                 | " 3.824082   | 8.06                            | -                                  |
| 87328        | 4474                 | " 3.565326   | 27.26                           | -                                  |
| 86963        | 4475                 | " 3.306569   | 16.46                           | -                                  |
| 86598        | <b>4476</b>          | " 3.047813   | 5.66                            | -                                  |
| 86232        | 4477                 | " 3.789056   | 23.84                           | -                                  |
| 85867        | 4478                 | " 3.530299   | 13.04                           | -                                  |
| 85502        | 4479                 | " 3.271543   | 2.24                            | -                                  |
| 85137        | <b>4480</b>          | " 3.012786   | 21.43                           | -                                  |
| 84771        | 4481                 | " 3.75403  | 9.62                            | -                                  |
| 84406        | 4482                 | " 3.495273   | 28.81                           | -                                  |
| 84041        | 4483                 | " 3.236517   | 18.01                           | -                                  |
| 83676        | <b>4484</b>          | " 3.977760   | 7.21                            | -                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 83310         | 4485                    | " 3.719004  | 25.39                                    | -   |
| 82945         | 4486                    | " 3.460247  | 14.59                                    | -   |
| 82580         | 4487                    | " 3.201491  | 3.79                                     | -   |
| 82215         | <b>4488</b>             | " 3.942734  | 22.99                                    | -   |
| 81849         | 4489                    | " 3.683878  | 11.16                                    | -   |
| 81484         | 4490                    | " 3.425221  | 0.37                                     | -   |
| 81119         | 4491                    | " 3.166465  | 19.57                                    | -   |
| 80754         | <b>4492</b>             | " 3.907708  | 8.77                                     | -   |
| 80388         | 4493                    | " 3.648952  | 26.95                                    | -   |
| 80023         | 4494                    | " 3.390195  | 16.15                                    | -   |
| 79658         | 4495                    | " 3.131439  | 5.35                                     | -   |
| 79293         | <b>4496</b>             | " 3.872682  | 24.55                                    | -   |
| 78927         | 4497                    | " 3.613926  | 12.73                                    | -   |
| 78562         | 4498                    | " 3.35517   | 1.93                                     | -   |
| 78197         | 4499                    | " 3.09641   | 21.12                                    | -   |
| 77832         | <b>4500</b>             | " 3.83766   | 10.32                                    | -   |
| 77466         | 4501                    | " 3.5789  | 28.51                                    | -   |
| 77101         | 4502                    | " 3.320143  | 17.71                                    | -   |
| 76736         | 4503                    | " 3.061387  | 6.91                                     | -   |
| 76371         | <b>4504</b>             | " 3.802630  | 26.1                                     | -   |
| 76005         | 4505                    | " 3.543874  | 14.29                                    | -   |
| 75640         | 4506                    | " 3.285111  | 3.48                                     | -   |
| 75275         | 4507                    | " 3.026361  | 22.69                                    | -   |
| 74910         | <b>4508</b>             | " 3.767604  | 11.89                                    | -   |
| 74544         | 4509                    | " 3.508848  | 0.08                                     | -   |
| 74179         | 4510                    | " 3.250091  | 19.28                                    | -   |
| 73814         | 4511                    | " 3.991335  | 8.47                                     | -   |
| 73449         | <b>4512</b>             | " 3.732578  | 27.67                                    | -   |
| 73083         | 4513                    | " 3.473822  | 15.86                                    | -   |
| 72718         | 4514                    | " 3.215065  | 5.06                                     | -   |

| Julian Day | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 72352      | 4515                 | " 2.95650  | 24.26                           | -                                  |
| 71987      | <b>4516</b>          | " 2.697552   | 13.46                           | -                                  |
| 71621      | 4517                 | " 2.438796   | 1.64                            | -                                  |
| 71256      | 4518                 | " 2.180039   | 20.85                           | -                                  |
| 70891      | 4519                 | " 2.921283   | 8.98                            | -                                  |
| 70526      | <b>4520</b>          | " 2.662527   | 28.18                           | -                                  |
| 70160      | 4521                 | " 2.40377  | 16.37                           | -                                  |
| 69795      | 4522                 | " 2.145014   | 5.57                            | -                                  |
| 69430      | 4523                 | " 2.886257   | 24.77                           | -                                  |
| 69065      | <b>4524</b>          | " 2.627501   | 13.96                           | -                                  |
| 68699      | 4525                 | " 2.368744   | 2.15                            | -                                  |
| 68334      | 4526                 | " 2.109988   | 21.35                           | -                                  |
| 67969      | 4527                 | " 2.851231   | 10.55                           | -                                  |
| 67604      | <b>4528</b>          | " 2.592475   | 29.74                           | -                                  |
| 67238      | 4529                 | " 2.333718   | 17.93                           | -                                  |
| 66873      | 4530                 | " 2.074962   | 7.1                             | -                                  |
| 66508      | 4531                 | " 2.816205   | 26.33                           | -                                  |
| 66143      | <b>4532</b>          | " 2.557449   | 15.53                           | -                                  |
| 65777      | 4533                 | " 2.298692   | 3.72                            | -                                  |
| 65412      | 4534                 | " 2.039936   | 22.92                           | -                                  |

*The living beings inhabiting the sub-terranean regions  
are full of prowess and gigantic of body*

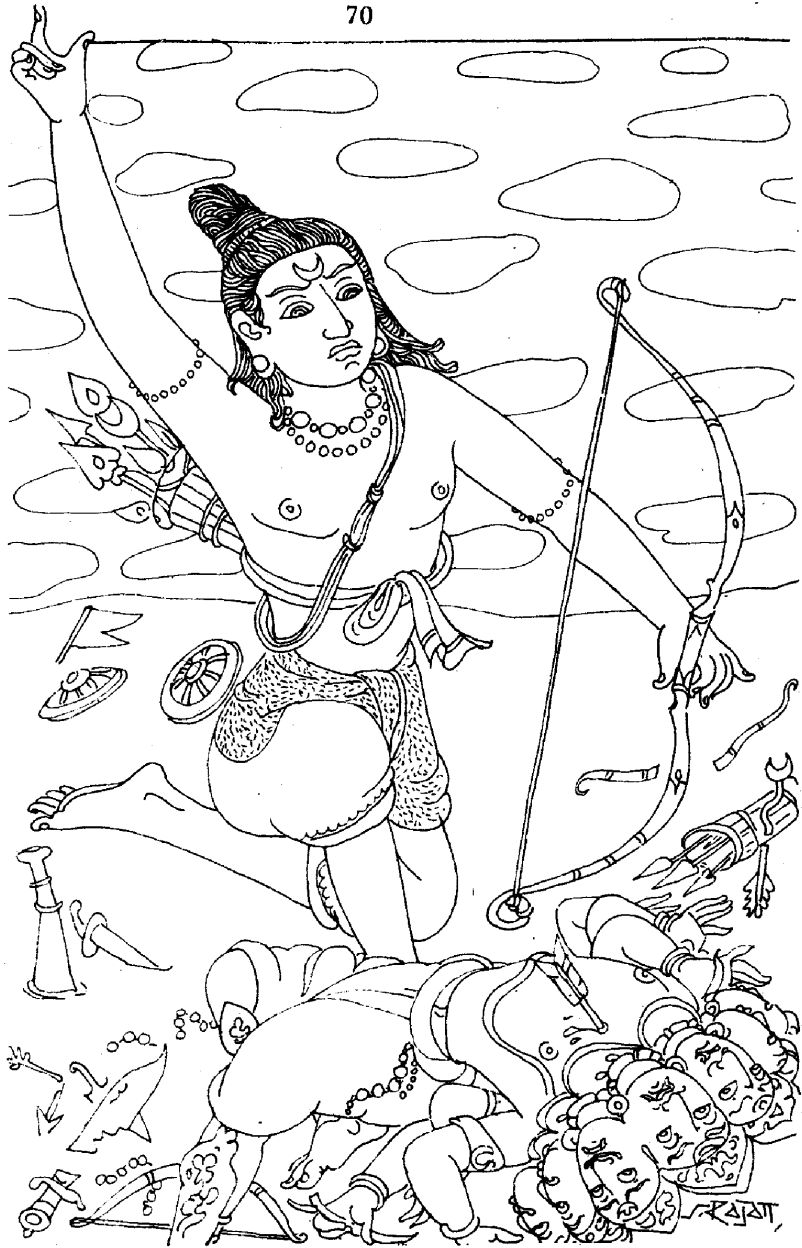
*Balakanda - Canto 41  
Verse 2*

| Julian Day | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 65047      | 4535                 | Feb. 2.781179  | 12.11                           | -                                  |
| 64682      | <b>4536</b>          | " 2.522423   | 1.31                            | -                                  |
| 64316      | 4537                 | " 2.263666   | 19.5                            | -                                  |
| 63951      | 4538                 | " 2.00491  | 8.7                             | -                                  |
| 63586      | 4539                 | " 2.746153   | 27.9                            | -                                  |
| 63221      | <b>4540</b>          | " 2.487397   | 17.1                            | -                                  |
| 62855      | 4541                 | " 2.22864  | 5.24                            | -                                  |
| 62490      | 4542                 | " 2.969884   | 24.44                           | -                                  |
| 62125      | 4543                 | " 2.711127   | 13.64                           | -                                  |
| 61760      | <b>4544</b>          | " 2.452371   | 2.83                            | -                                  |
| 61394      | 4545                 | " 2.193614   | 21.02                           | -                                  |
| 61029      | 4546                 | " 2.934858   | 10.22                           | -                                  |
| 60664      | 4547                 | " 2.676101   | 29.42                           | -                                  |
| 60299      | <b>4548</b>          | " 2.417345   | 18.62                           | -                                  |
| 59933      | 4549                 | " 2.158588   | 6.81                            | -                                  |
| 59568      | 4550                 | " 2.899832   | 26.01                           | -                                  |
| 59203      | 4551                 | " 2.641075   | 15.20                           | -                                  |
| 58838      | <b>4552</b>          | " 2.382319   | 4.4                             | -                                  |
| 58472      | 4553                 | " 2.123562   | 22.57                           | -                                  |
| 58107      | 4554                 | " 2.864806   | 11.79                           | -                                  |
| 57742      | 4555                 | " 2.606049   | 0.99                            | -                                  |
| 57377      | <b>4556</b>          | " 2.347293   | 20.18                           | -                                  |
| 57011      | 4557                 | " 2.088536   | 8.37                            | -                                  |
| 56646      | 4558                 | " 2.82978  | 27.57                           | -                                  |
| 56281      | 4559                 | " 2.571023   | 16.78                           | -                                  |
| 55916      | <b>4560</b>          | " 2.312267   | 5.97                            | -                                  |
| 55550      | 4561                 | " 2.05351  | 24.14                           | -                                  |
| 55185      | 4562                 | " 2.794754   | 13.34                           | -                                  |
| 54820      | 4563                 | " 2.535997   | 2.54                            | -                                  |
| 54455      | <b>4564</b>          | " 2.277241   | 21.73                           | -                                  |

| Julian Day | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 54089      | 4565                 | Feb. 2.018484  | 9.92                            | -                                  |
| 53724      | 4566                 | " 2.759728   | 29.12                           | -                                  |
| 53359      | 4567                 | " 2.500971   | 18.32                           | -                                  |
| 52994      | <b>4568</b>          | " 2.242215   | 7.52                            | -                                  |
| 52628      | 4569                 | " 2.983458   | 25.71                           | -                                  |
| 52263      | 4570                 | " 2.724702   | 14.91                           | -                                  |
| 51898      | 4571                 | " 2.465745   | 4.1                             | -                                  |
| 51533      | <b>4572</b>          | " 2.207189   | 23.3                            | -                                  |
| 51167      | 4573                 | " 2.948432   | 11.5                            | -                                  |
| 50802      | 4574                 | " 2.687676   | 0.69                            | -                                  |
| 50437      | 4575                 | " 2.430919   | 19.89                           | -                                  |
| 50072      | <b>4576</b>          | " 2.172163   | 9.09                            | -                                  |
| 49706      | 4577                 | " 2.913406   | 27.22                           | -                                  |
| 49341      | 4578                 | " 2.654649   | 16.47                           | -                                  |
| 48976      | 4579                 | " 2.395893   | 5.67                            | -                                  |
| 48611      | <b>4580</b>          | " 2.137136   | 24.87                           | -                                  |
| 48245      | 4581                 | " 2.87838  | 13.01                           | -                                  |
| 47880      | 4582                 | " 2.619623   | 2.21                            | -                                  |
| 47515      | 4583                 | " 2.360867   | 21.41                           | -                                  |
| 47150      | <b>4584</b>          | " 2.102110   | 10.6                            | -                                  |
| 46784      | 4585                 | " 2.843354   | 28.79                           | -                                  |
| 46419      | 4586                 | " 2.584597   | 18.0                            | -                                  |
| 46054      | 4587                 | " 2.325841   | 7.19                            | -                                  |
| 45689      | <b>4588</b>          | " 2.067084   | 26.39                           | -                                  |
| 45323      | 4589                 | " 2.808328   | 14.58                           | -                                  |
| 44958      | 4590                 | " 2.549571   | 3.78                            | -                                  |
| 44593      | 4591                 | " 2.290815   | 22.97                           | -                                  |
| 44228      | <b>4592</b>          | " 2.032058   | 12.17                           | -                                  |
| 43862      | 4593                 | " 2.773302   | 0.36                            | -                                  |
| 43497      | 4594                 | " 2.514545   | 19.56                           | -                                  |

| Julian Day | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|------------|----------------------|--|---------------------------------|------------------------------------|
| (1)        | (2)                  | (3)  | (4)                             | (5)                                |
| 43132      | 4595                 | Feb. 2.255789  | 8.76                            | -                                  |
| 42767      | <b>4596</b>          | " 2.997032   | 27.95                           | -                                  |
| 42401      | 4597                 | " 2.738276   | 16.14                           | -                                  |
| 42036      | 4598                 | " 2.479519   | 5.34                            | -                                  |
| 41671      | 4599                 | " 2.220763   | 24.53                           | -                                  |
| 41306      | <b>4600</b>          | " 2.962006   | 13.73                           | -                                  |
| 40940      | 4601                 | " 2.70325  | 1.91                            | -                                  |
| 40575      | 4602                 | " 2.44449  | 21.11                           | -                                  |
| 40210      | 4603                 | " 2.185737   | 10.31                           | -                                  |
| 39845      | <b>4604</b>          | " 2.92698  | 29.5                            | -                                  |
| 39479      | 4605                 | " 2.668224   | 17.69                           | -                                  |
| 39114      | 4606                 | " 2.409467   | 6.89                            | -                                  |
| 38749      | 4607                 | " 2.150711   | 26.09                           | -                                  |
| 38384      | <b>4608</b>          | " 2.891954   | 15.29                           | -                                  |
| 38018      | 4609                 | " 2.633198   | 3.48                            | -                                  |
| 37653      | 4610                 | " 2.374441   | 22.68                           | -                                  |
| 37288      | 4611                 | " 2.114685   | 11.87                           | -                                  |
| 36922      | <b>4612</b>          | " 1.856926   | 1.07                            | -                                  |
| 36556      | 4613                 | " 1.598172   | 19.26                           | -                                  |
| 36191      | 4614                 | " 1.339415   | 8.46                            | -                                  |
| 35826      | 4615                 | " 1.080659   | 27.66                           | -                                  |
| 35461      | <b>4616</b>          | " 1.821907   | 15.85                           | -                                  |
| 35095      | 4617                 | " 1.563155   | 4.04                            | -                                  |
| 34730      | 4618                 | " 1.304402   | 23.24                           | -                                  |
| 34365      | 4619                 | " 1.04565  | 12.44                           | -                                  |
| 34000      | <b>4620</b>          | " 1.786987   | 1.64                            | -                                  |
| 33634      | 4621                 | " 1.528145   | 19.83                           | -                                  |
| 33269      | 4622                 | " 1.269392   | 9.03                            | -                                  |
| 32904      | 4623                 | " 1.01064  | 28.23                           | -                                  |
| 32539      | <b>4624</b>          | " 1.751887   | 17.42                           | -                                  |

| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investigation |
|---------------|-------------------------|---|--|--|
| (1)           | (2)                     | (3)   | (4)                                      | (5)                                      |
| 32173         | 4625                    | Feb. 1.493135   | 5.51                                     | -  |
| 31808         | 4626                    | " 1.234382  | 24.72                                    | -  |
| 31443         | 4627                    | " 1.97563   | 13.93                                    | -  |
| 31078         | <b>4628</b>             | " 1.716877  | 3.11                                     | -  |
| 30712         | 4629                    | " 1.458125  | 21.31                                    | -  |
| 30347         | 4630                    | " 1.199372  | 10.51                                    | -  |
| 29982         | 4631                    | " 1.94062   | 29.71                                    | -  |
| 29617         | <b>4632</b>             | " 1.681867  | 18.91                                    | -  |
| 29251         | 4633                    | " 1.423115  | 7.09                                     | -  |
| 28886         | 4634                    | " 1.164362  | 26.29                                    | -  |
| 28521         | 4635                    | " 1.90561   | 15.49                                    | -  |
| 28156         | <b>4636</b>             | " 1.646859  | 4.69                                     | -  |
| 27790         | 4637                    | " 1.388105  | 22.89                                    | -  |
| 27425         | 4638                    | " 1.129352  | 12.07                                    | -  |
| 27060         | 4639                    | " 1.8706  | 1.27                                     | -  |
| 26695         | <b>4640</b>             | " 1.611847  | 20.47                                    | -  |
| 26329         | 4641                    | " 1.353095  | 8.63                                     | -  |
| 25964         | 4642                    | " 1.094342  | 27.83                                    | -  |
| 25599         | 4643                    | " 1.83559   | 17.03                                    | -  |
| 25234         | <b>4644</b>             | " 1.576837  | 6.23                                     | -  |
| 24868         | 4645                    | " 1.318085  | 24.42                                    | -  |
| 24503         | 4646                    | " 1.059332  | 13.62                                    | -  |
| 24138         | 4647                    | " 1.80058   | 2.82                                     | -  |
| 23773         | <b>4648</b>             | " 1.541827  | 22.02                                    | -  |
| 23407         | 4649                    | " 1.283075  | 10.21                                    | -  |
| 23042         | 4650                    | " 1.024322  | 29.41                                    | -  |
| 22677         | 4651                    | " 1.76557   | 18.61                                    | -  |
| 22312         | <b>4652</b>             | " 1.506817  | 7.81                                     | -  |
| 21946         | 4653                    | " 1.248065  | 26.0                                     | -  |
| 21581         | 4654                    | " 1.989312  | 15.2                                     | -  |



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| Julian<br>Day | B.C. Year<br>Leap Years | Commencement of<br>Solar New Year,<br>Month, Day and<br>fraction of day | Titi at<br>Sunrise<br>on the<br>next day | Selected<br>for further<br>investiga-<br>tion |
|---------------|-------------------------|---|--|---|
| (1)           | (2)                     | (3)   | (4)                                      | (5)   |
| 21216         | 4655                    | Feb. 1.73056  | 4.4                                      | -   |
| 20851         | <b>4656</b>             | " 1.471807  | 23.6                                     | -   |
| 20485         | 4657                    | " 1.213055  | 11.79                                    | -   |
| 20120         | 4658                    | " 1.954302  | 0.99                                     | -   |
| 19755         | 4659                    | " 1.69555   | 20.19                                    | -   |
| 19390         | <b>4660</b>             | " 1.436797  | 9.39                                     | -   |
| 19024         | 4661                    | " 1.177882  | 27.53                                    | -   |
| 18659         | 4662                    | " 1.919292  | 16.72                                    | -   |
| 18294         | 4663                    | " 1.66054   | 5.92                                     | -   |
| 17929         | <b>4664</b>             | " 1.401787  | 25.12                                    | -   |
| 17563         | 4665                    | " 1.143035  | 13.3                                     | -   |
| 17198         | 4666                    | " 1.884282  | 2.5                                      | -   |
| 16833         | 4667                    | " 1.62553   | 21.7                                     | -   |
| 16468         | <b>4668</b>             | " 1.36677   | 10.9                                     | -   |
| 16102         | 4669                    | " 1.108025  | 29.08                                    | -   |
| 15737         | 4670                    | " 1.849272  | 18.28                                    | -   |
| 15372         | 4671                    | " 1.59052   | 7.48                                     | -   |
| 15007         | <b>4672</b>             | " 1.331767  | 26.68                                    | -   |
| 14641         | 4673                    | " 1.073015  | 15.88                                    | -   |
| 14276         | 4674                    | " 1.814262  | 4.08                                     | -   |
| 13911         | 4675                    | " 1.555095  | 23.28                                    | -   |
| 13546         | <b>4676</b>             | " 1.296757  | 12.78                                    | -   |
| <b>13180</b>  | <b>4677</b>             | <b>" 1.038004</b>   | <b>0.97</b>                              | <b>Yes</b>                                    |
| 12815         | 4678                    | " 1.779252  | 20.17                                    | -   |
| 12450         | 4679                    | " 1.520499  | 9.36                                     | -   |
| 12085         | <b>4680</b>             | " 1.261747  | 28.21                                    | -   |
| 11719         | 4681                    | " 1.002994  | 16.4                                     | -   |
| 11354         | 4682                    | " 1.744242  | 5.6                                      | -   |
| 10989         | 4683                    | " 1.48548   | 24.8                                     | -   |
| 10624         | <b>4684</b>             | " 1.226737  | 14.0                                     | -   |

| Julian Day  | B.C. Year Leap Years | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Selected for further investigation |
|-------------|----------------------|--|---------------------------------|------------------------------------|
| (1)         | (2)                  | (3)  | (4)                             | (5)                                |
| 10258       | 4685                 | Feb. 1.967984  | 2.18                            | -                                  |
| 9893        | 4686                 | " 1.709232   | 21.38                           | -                                  |
| 9528        | 4687                 | " 1.450479   | 10.58                           | -                                  |
| 9163        | <b>4688</b>          | " 1.191727   | 29.78                           | -                                  |
| 8797        | 4689                 | " 1.932974   | 17.97                           | -                                  |
| 8432        | 4690                 | " 1.674222   | 7.17                            | -                                  |
| 8067        | 4691                 | " 1.415469   | 26.36                           | -                                  |
| 7702        | <b>4692</b>          | " 1.156717   | 15.56                           | -                                  |
| 7336        | 4693                 | " 1.897964   | 3.75                            | -                                  |
| 6971        | 4694                 | " 1.639212   | 22.95                           | -                                  |
| 6606        | 4695                 | " 1.380459   | 12.15                           | -                                  |
| <b>6241</b> | <b>4696</b>          | " <b>1.121707</b>  | <b>1.34</b>                     | <b>Yes</b>                         |
| 5875        | 4697                 | " 1.862954   | 19.53                           | -                                  |
| 5510        | 4698                 | " 1.604202   | 8.73                            | -                                  |
| 5145        | 4699                 | " 1.345449   | 27.93                           | -                                  |
| 4780        | <b>4700</b>          | " 1.086697   | 17.11                           | -                                  |

#### Calculation of Moon's Longitude for 5 p.m. on solar new year days:

The longitudes of Moon given under column 5 in the short list (Table II.4) against respective solar new year days are as per the following typical calculations, treating the 10th January, 3104 B.C., as the key day, as the Moon was at 312.61 degrees at 5 p.m. as worked out by Prof. K. Srinivasa Raghavan.

#### Typical Calculation

|  |        |
|--|--------|
| Julian Day on the 10th January 3104 B.C.               | 587697 |
| Julian Day on the 11th February 4433 B.C.              | 102311 |
| Difference   | 485386 |
| Dividing by 27.321661 synodical days. we get 17765.611 |        |
| i.e., 17765 synodical periods have rolled.             |        |

The balance is 0.611 of the synodical period,  
So  $0.611 \times 360^\circ$  i.e.,  $219^\circ.96$  got completed.

The longitude on the key day was  $312^\circ.61$ .  
Subtract  $219^\circ.96$  from  $312^\circ.61$ . We get  $92^\circ.65$ .

So the longitude at 5 p.m. on the 11th February 4433 B.C. was  $92^\circ.65$ . We have already seen that the birth of Sri Rama took place on the 9th day of a solar new year at 10.79667 hours a.m. and the longitude of Moon at the moment was  $90^\circ.0001$ .

The difference in days from 5 p.m. of a solar new year day up to 10.79667 hours a.m., on the 9th day is 7.7415277 days. Moon travels  $13^\circ.1764$  per day and so  $102^\circ.005$  in 7.7415277 days. If Moon were to be at  $90^\circ.0001$  on the 9th day of a solar new year, he should be at  $90^\circ.0001$  minus  $102^\circ.005$  i.e.,  $347^\circ.9952$  at 5 p.m. on the particular solar new year day.

However for purpose of further investigation the solar new years in which Moon was between 347 to 349 degrees at 5 p.m. on that day have been selected from the short list.

**TABLE II.4.**

**SHORT LIST OF SRI RAMA'S PROBABLE BIRTH YEARS.**

| B.C. Year | Julian Day | Commencement of Solar New Year, Month, Day and fraction of day | Titi at Sunrise on the next day | Longitude of Moon at 5 p.m. | Selected for further investigation |
|-----------|------------|--|---------------------------------|-----------------------------|------------------------------------|
| 3560      | 421175     | Feb. 11.068767   | 1.038                           | 359.05                      | -                                  |
| 3579      | 414235     | " 11.152293  | 0.719                           | 355.126                     | -                                  |
| 3587      | 411413     | " 11.082341  | 2.272                           | 251.446                     | -                                  |
| 3598      | 407295     | " 11.23602   | 0.402                           | 351.202                     | -                                  |
| 3606      | 404373     | " 11.165968  | 1.956                           | 9.85                        | -                                  |
| 3625      | 397433     | " 11.249594  | 1.64                            | 5.926                       | -                                  |
| 3823      | 325112     | " 9.015807   | 1.037                           | 358.51                      | -                                  |
| 3850      | 315249     | " 8.029382   | 1.257                           | 0.094                       | -                                  |
| 3869      | 308309     | " 8.113009   | 0.94                            | 356.17                      | -                                  |
| 3877      | 305387     | " 8.042957   | 2.493                           | 14.89                       | -                                  |

|      |        |   |          |       |        |     |
|------|--------|---|----------|-------|--------|-----|
| 3888 | 301370 | " | 8.196635 | 1.637 | 5.53   | -   |
| 4105 | 222109 | " | 7.046474 | 0.73  | 354.01 | -   |
| 4124 | 215170 | " | 7.130100 | 1.422 | 3.37   | -   |
| 4143 | 208229 | " | 6.213727 | 0.098 | 346.09 | -   |
| 4151 | 205307 | " | 6.143675 | 1.63  | 4.81   | -   |
| 4170 | 199367 | " | 6.227302 | 1.32  | 217.21 | -   |
| 4197 | 188505 | " | 6.240876 | 2.55  | 15.61  | -   |
| 4387 | 119106 | " | 4.077141 | 0.41  | 349.69 | -   |
| 4395 | 116184 | " | 4.001089 | 1.96  | 8.41   | -   |
| 4406 | 112166 | " | 4.160768 | 0.1   | 345.73 | -   |
| 4414 | 109244 | " | 4.090716 | 1.65  | 4.45   | -   |
| 4422 | 106321 | " | 3.020664 | 2.18  | 9.85   | -   |
| 4433 | 102303 | " | 3.174342 | 0.31  | 347.17 | Yes |
| 4441 | 99381  | " | 3.104290 | 1.84  | 5.89   | -   |
| 4460 | 92442  | " | 3.187917 | 2.55  | 15.25  | -   |
| 4677 | 13180  | " | 1.038004 | 0.97  | 350.77 | -   |
| 4696 | 6241   | " | 1.121707 | 1.34  | 359.77 | -   |

## NOTE:

As explained earlier, the guidance for the selection of probable years for further investigation is as follows:

1. The solar new year should have commenced before sunrise i.e., 6 a.m. 0.25 day.
2. The range of titi on next day should be 0.003 to 2.859; and
3. The longitude of Moon on that day should be between  $347^{\circ}$  and  $349^{\circ}$  at 5 p.m.

ACCORDING TO THE ABOVE THE YEAR 4433 B.C.,  
ALONE SATISFIES THE REQUIREMENTS AND  
HENCE IS SELECTED FOR FURTHER INVESTIGATION.

Fixing the date of birth of Sri Rama in 4433 B.C.

BY HIS GRACE, we have succeeded in discovering the year of birth of Sri Rama as 4433 B.C. In fact, the discovery shows that there is no other year between 3500 B.C., to 4700 B.C., in which Sri Rama could have been born. There is no need for any wavering. There is no other choice also on this. Just like the saying that all roads lead to Rome, all our calculations lead to the year 4433 B.C. Our next task is to fix the date of birth in this year.

We have already seen that in the year of Sri Rama's birth, both the solar and lunar new years should occur on the same day. Since the longitude of the Sun is fixed at  $9^{\circ}.0$ , obviously the birth should have taken place only on the 9th day from the solar new year day, assuming an average of 1 degree as Sun's daily motion. Likewise, the birth should have taken place on the 9th day from the lunar new year day, since the tithi of Sri Rama's birth is Sukla Navami. Thus the birth date automatically gets fixed as the 9th day from the day on which the solar and lunar new years coincided. In the selected year of birth of Sri Rama, the solar and lunar new year days occurred on the 3rd February. The ninth day from this is 11th February. Thus the date of birth of Sri Rama is 11th February, 4433 B.C.

**Data required to fix the time of birth of Sri Rama.**

In chapter I, we have already seen that Sri Rama should have been born at 13 ghatikas after sunrise on that day. When converted, 13 ghatikas are equal to 5 hours 12 minutes. If we add the time of sunrise in local mean time to this, we will get the birth time of Sri Rama. So our next task is to find out the local mean time of the sunrise on the 11th February, 4433 B.C.

**Determination of Sunrise and Sunset at Ayodhya.  $26^{\circ} 48'$  (N) on the 11th February, 4433 B.C.**

To calculate the actual time of birth we want the time of sunrise. To determine the sunrise at any place, the declination of the Sun and the latitude of the place are required. We know the latitude of Ayodhya as  $26^{\circ} 48'$  (N). To know the declination of the Sun on that day, we require an ephemeris of the year for ready reference. But we do not have one. So we have to arrive at this by a different method.

We have seen elsewhere that the vernal equinox occurred on the 3rd February, 4433 B.C., in the year of Sri Rama's birth. This kind of vernal equinox is occurring on the 13/14th April of every year nowadays. Further, nowadays, the Sun crosses the Celestial Equator on the 21st March of every year, when the night and the day are equal. So that point in the Celestial Equator where the Sun crosses it, from south to north, is taken for reference and the distances are always measured only in one direction (not on both sides from the point)

i.e., eastward and complete the circle of 360 degrees. So the Sun may be at  $10^\circ$  or  $20^\circ$  etc., from this point. This measurement is called the Right Ascension. This phenomena was the same for the ancient times also. Only the date of occurrence varies from time to time. The movement of the Sun from the day it crosses the Celestial Equator and the date of occurrence of the Vernal Equinox must be the same in the remote past and now. Likewise the movement of the Sun in its ecliptic path from the date of vernal equinox, will be the same between the past and now. The Sun will move to his 9th degree of longitude on the 23rd or 24th April every year now. A reference to any modern ephemeris would show that the Sun attains its declination of about  $12^\circ 20'$  average, every year. This average has been arrived at after calculating from the declinations of the Sun taken from the Raphael's Ephemeris for a number of years. This average declination of  $12^\circ 25'$  will be near to the declination of the Sun on the 11th February, 4433 B.C., the day of birth of Sri Rama.

Having fixed the declination of the Sun as  $12^\circ 25'$  on the 11th February 4433 B.C., let us now apply a modern method to determine the sunrise and sunset timing on that day.

$$\text{Log Sin Ascensional Difference} = \text{Log Tan Declination of Sun} + \text{Log Tan latitude of place}$$

Substituting the above with relevant figures, we have

$$\begin{aligned} \text{Log Sin Ascensional Difference} &= \text{Log Tan } 12^\circ 25' + \text{Log Tan } 26^\circ 48' \\ &= 9.3428 + 9.7034 = \text{Sin } 6^\circ 23' \end{aligned}$$

As the declination is north add this to  $90^\circ$ . We get  $96^\circ 23'$

Converting this into hours, minutes and seconds we get 6 hrs. 26 min. So local apparent time of Sun setting is 6 hrs. 26min. p.m.

This subtracted from 12 hours gives the time of sunrise as 5 hrs. 33 min. 48 secs. a.m.

So the apparent Local Mean Time of sunrise on the 11th February 4433 B.C. is 5 hrs. 33 min. 48 secs.

To get the Local Mean Time, we have to add the Equation of Time of 2 minutes (obtained from the Tables of Equation of Time found in the book 'A Manual of Hindu Astrology' by B.V.Raman, to the apparent time of sunrise and sunset.

Adding 2 minutes we get the following results.

Local Mean Time of Sunrise: 5 hours, 35 min. 48 secs. a.m.

Local Mean Time of Sunset: 6 hours, 28 min. 48 secs p.m.

To fix the time of birth of Sri Rama on the 11th February, 4433 B.C.

Time of birth of Sri Rama in ghatikas after sunrise; 13

Equivalent of 13 ghatikas: 5h. 12m.

Sunrise on the 11th February 4433 B.C. 5h. 35m. 48s.

Adding the above two items 10h. 47m. 48s.

So the birth time of Sri Rama on the 11th February, 4433 B.C. is 10 hours, 47 minutes, 48 seconds a.m.

To fix the week day of Sri Rama's birth:

Having successfully fixed the date of birth of Sri Rama as the 11th February, 4433 B.C., it is simple to calculate the week day. But before that, let us discuss Ramayana and the week day in another context.

One conspicuous aspect observed in the close and critical study of Valmiki Ramayana is that the poet has not made any kind of reference at all about the week day, anywhere in his entire epic, though he has made several references about the other units like, day, night, month, year, rathu, titi, nakshatra etc., in the following instances or slokas.

|                 |   |
|-----------------|---|
| Bala Kanda:     | 13.1; 15.20; 14.1; 18.8; 19.18; 22.22;<br>23.17; 26.22; 34; 29.32; 30.5; 47.20; 69.7;<br>12; 34.14; 35.1, 6; 45.5; 46.6. 12, 16;<br>47.1; 49.1; 50.47; 52.1; 54.1, 35; 56.1;<br>57.5; 59.7; 63.4; 65.1, 36; 66.1; 68.1, 21;<br>69.1; 70.1; 71.23; 72.13, 21; 73.7, 8; 74.1; |
| Ayodhya Kanda   | 3.4, 15, 16, 41; 4.2, 21; 67.2; 67.1; 69.1;<br>71.18; 83.23; 84.18; 89.1; 90.23; 105.1;   |
| Aranya Kanda    | 2.1; 8.1; 11.5; 11.25, 28; 11.70;   |
| Kishkinda Kanda | 1.22, 41, 92; 26.13, 16; 27.39, 44; 28.54;<br>30.78; 32.14; 33.45; 40.70; 47.9; 53.2, 15,<br>18, 21, 22; 53.26; 67.25; 58.5; 64.14;   |

|               |   |
|---------------|---|
| Sundara Kanda | 4.2, 4; 22.8; 31.12; 33.18, 33; 37.8, 36,<br>67; 39.20; 40.10; 58.47; 58.51; 58.47;<br>58.51, 69, 106; 65.24;   |
| Yudha Kanda   | 4.6; 17.1; 21.11; 22.68/72; 25.24, 26;<br>31.22; 38.3, 18; 44.1, 17, 26; 57.3; 74.7,<br>40; 75.4, 26, 41, 50; 92.6, 8, 16; 93.68;<br>94.5, 8; 124.1; 124.1, 17; 128.22; 129.14,<br>53; 131.9, 50; |

(figures before the stop indicates the sarga and figures between stop and semi-colon indicate the sloka numbers from M.L.J. edition)

Naturally a question arises as to what could be the reason for this conspicuous omission? One obvious explanation could be that the system of reckoning a day by a week day might have not been in existence during that age. The system of naming the week days by the planets could have been introduced in Bharath only subsequently. There is a section of scholars who opine that reference to week days commenced from Varaha Mihira by about 400 A.D. As to the exact period of its introduction in India, it is a historical question, requiring deep study.

A few commentators claim that Valmiki has referred to a week day and in support the following sloka in Ayodhya Kanda, Sarga 26, Sloka 9 is quoted. अद्य बार्हस्पतः श्रीमानुक्रः पुष्यो नु राघव

"Oh Rama, today is Thursday with Pushya nakshatra."

This is how they interpret the meaning of the above sloka. They claim that Brahaspatha Sreeman indicates Thursday and Pushya indicates the nakshatra of the day. It may be interesting to note here, that this is the only sloka that these commentators quote in support of their claim.

It is beyond one's imagination that when the system of reckoning a day by a week day was in existence during the days of Valmiki, he would have referred to it only on a solitary occasion. But a close and critical study of the construction of the words in the above sloka would reveal that Barhaspatha is used as an epithet of Pushya nakshatra, since Brihaspathy is the deity of Pushya. It is a habit of Valmiki to



use an epithet invariably on all occasions. So the interpretations of a few commentators that Brahaspatha means Thursday does not appeal to us for acceptance.

Saint Purandara Dasa has made a reference regarding the week day of the birth of Sri Rama and says that it is Wednesday. This could be by his divine intuition. This could not have been by a direct reference to Valmiki Ramayana. As far as Ramayana is concerned, Valmiki is the only authority since he composed the epic first.

It is highly appreciable indeed, to recapitulate now that so far we have depended on the internal evidence only for establishing or substantiating any point or seeking information. Since this is a proper step in the right direction, let us follow the same principle without any kind of departure.

The name of the week day is essential and would be beneficial for a close and critical study of Sri Rama's horoscope. It is also important for assessing the strength of the shad bala, when we come to calculate it. The planet as the lord of the day of birth is assigned a value of 45 shashtiamsas as his varabala.

Modern astronomy gives us a method to find out the week day.

This method is adopted from the article which appeared in the Astrological Magazine, July, 1969; vol. 58, No. 7, page 700. The same is used to calculate the week day of Sri Rama's birth.

To find out the week day of Sri Rama's birth:

Date of birth of Sri Rama: 11th February, 4433 B.C.

Deducting the year 4433 B.C. from the standard 4713 B.C.,

we get 280.

Multiplying 280 by 365 days, we get 102200

Integral part of  $280 + 3 = 70$  and when added, we get 102270

4

No. of days up to the 11th February, 4433 B.C.

Excluding the 1st January = 41 days and when added, we get 102311. Dividing 102311 by 7 we get a quotient of 14615 and remainder of 6. Counting the remainder 6, from Tuesday, we get Sunday. So Sunday is the week day of Sri Rama's birth.

**Summary:**

Thus far, we have succeeded in finding out the following data.

1. The year of Sri Rama's birth.
2. The date of His birth.
3. The time of His birth.
4. The week day of His birth.

We are yet to find out the longitudes of the planets Budha, Rahu and Ketu to complete the collection of all the basic data required for a complete study on the astrological aspects. There appears to be no way of getting these direct from the epic. So we have to resort to some other method quite suitable and satisfactory for our purpose. One method is to devise a suitable and acceptable formula to calculate the longitudes of the planets for the remote past period.

Calculate by that formula the longitudes of the planets Kuja, Guru, Sukra and Sani. Compare these results with the longitudes already arrived at in Chapter I for these four planets directly from the epic itself, correct to the second. If the difference between them is a few degrees either side, they may be ignored in view of the remoteness of the period and taken as correct. If the results are very near or correct to the minute of the already arrived longitudes, we can then take it that the formula devised is proper for adoption.

Apply the same formula and calculate the longitudes of Budha, Rahu and Ketu. Then these results are bound to be correct and can be confidently adopted, with the same status for the results as that of the other planets, Kuja, Guru, Sukra and Sani.

So our next task is to develop a method and formula to calculate the longitudes of the planets for the 11th February. 4433 B.C.



*No gift should be made to any one with disrespect or even with irreverence*

**Balakanda - Chapter 13**  
**Verse 32**

# CHAPTER III

## DEVELOPMENT OF METHOD OF CALCULATIONS OF LONGITUDES AND LATITUDES.

### Objective:

Having successfully found out the year, date and time of birth of Sri Rama, our next task is to find out a method to calculate the longitudes of the planets Kuja, Guru, Sukra and Sani on the 11th February, 4433 B.C.,

### A word in clarification:

One may think that the exercise done in Chapter I is an intellectual play upon the captivating web of words of Valmiki and cannot by itself, without other corroborating evidence, be treated as acceptable. To satisfy this type of thinker, a necessity to bring in an external tool of modern astronomy to calculate the longitudes of the planets at the time of Sri Rama's birth, arises. Definitely it is not the intention to prove what Valmiki has given is true. If it is done so, it will be akin to show disrespect to the great poet.

### Systems in vogue:

In India there are two well-known systems, one based on fixed and the other on moving zodiac, i.e., Nirayana and Sayana or tropical. They are known as vakya sidhanta and drik ganitha sidhanta.

### Vakya Sidhanta:

In this system the results are obtained straight in nirayana. The formulae adopted are traditional. In many parts of India, panchangams are cast as per this method, popularly known as vakya panchangams. Mostly the results do not tally with the actual positions of the planets as observed in the modern laboratories. There are differences in the durations of titis, nakshatras, etc., from the results given by the other method i.e., drik ganitha method.

### **Drik Ganitha Method:**

In this method the longitudes of the planets are calculated first by the sayana system, which tally well with the positions of the planets observed by modern laboratories. Ayanamsa is then applied to the sayana longitudes to get the corresponding Nirayana longitudes. This system is in vogue in India for the last six or seven decades. This system is having wider acceptance and consequently the other system is getting obsolete.

Now the question is which system was being followed during the period of Rama. The vakya system might have been followed since a few centuries ago. It need not have been followed at that time. They might have followed a more scientific and sophisticated method. Let us look into this aspect deeper.

### **Critical Study of the epic:**

A critical and investigating study of Valmiki Ramayana gives enough and convincing clues and indications that during the time of Rama, the Hindus had technological superiority not only in astronomy but also in many other disciplines like science, medicine, surgery, machinery, flying devices, communications, space travel, satellite launching pads, sophisticated weapons like missiles etc., as compared to the advanced modern world. In fact every technological advancement in the present century only goes to show how believable it is that such superiority existed beyond mythology in that age. In fact, the modern advancement in the present century underlines the possibilities of the existence of these advancements. Our ancestors of two to three centuries ago would not have been able to visualise the existence of the flying vimanas during the period of Rama, as we do now.

### **Vimanas in Ramayana:**

We have some descriptions of vimanas like Pushpaka Vimana in Ramayana. It shows that they had the know-how to construct and operate such vimanas. What type of know-how they had, is beyond our imagination now. Perhaps their know-how might have been superior to ours. Superior because the Pushpaka Vimana, as described in the epic, was having capabilities of manoeuvring, load capacity

etc., better than the present day most sophisticated jet planes. For instance, Pushpaka Vimana can carry a pay load of one or two passengers, as in the case of Sita having been taken by someone, to the battle front to show the condition of Sri Rama in an unconscious condition. This shows that it can fly low also. The same vimana was able to transport not only Sri Rama, Sita, Sri Lakshmana, Vibhishna but also the entire vanara army from Sri Lanka and their womenfolk from Kishkinda to Ayodhya. Their number must definitely be in thousands. Compare it with our most sophisticated airships. They can carry at the most less than a thousand. Further, these air-ships have got to be properly balanced by make-shift arrangements for light and heavy loads. People of Rama's time must have mastered the technique of balancing the pay load. Such is the internal evidence available in the epic on their most complex and sophisticated aeronautical designing of their vimanas. But if we search for some external evidence, we can refer to the paper presented by an Italian Scientist Dr. Roberto Pinotti during the world Space Conference held in Bangalore in October 1988. His paper on air space technology appeared in the Hindu on the 12th October 1988. The following is an extract.

"India had a superior civilisation:

India may have had a superior civilisation with possible contacts with extra-terrestrial visitors, and the flying devices called 'Vimanas' described in ancient Indian texts may underline their possible connections with today's aerospace technology, an Italian scientist told the World Space Conference here today. Dr. Roberto Pinotti asked the delegates to examine in detail the Hindu texts instead of dismissing 'all the Vimana descriptions and traditions as mere myth'.

The importance of such studies and investigations may appear incredible now because the existence of flying devices beyond mythology can only be explained with a forgotten superior civilisation on earth, he said.

Pointing out that Indian Gods and heroes fought in the skies using piloted vehicles with terrible weapons, Dr. Pinotti said they were similar to modern jet-propelled flying devices.

### Thirty-two secrets:

He said certain descriptions of the vimanas seemed 'too detailed and technical in nature' to be labelled as myth. He cited various texts to show there were 32 secrets relating to the operation of vimanas some of which could be compared to modern day use of radar, solar energy and photography.

Quoting from 'Vymanika Shastra' he said the ancient flying devices of India were made from special heat absorbing metals named 'Somaka Sounda lika and Mourthwika'.

He said that the text also discussed the seven kinds of mirror and lenses installed aboard for defensive and offensive uses. The so called 'Pinjula Mirror' offered a sort of 'visual shield' preventing the pilots from being blinded by 'evil eyes' and the weapon 'Marika' used to shoot enemy aircraft 'does not seem too different from what we today call laser technology' he said.

According to the Italian expert, 'the principles of propulsion as far as the descriptions were concerned, might be defined as electrical and chemical energy was also involved.

For instance, the 'Tripura Vimana' mentioned in 'Vymanika Shastra' was a large craft operated by 'motive power generated by solar rays. Dr. Pinotti said, adding 'its elongated form was surely much closer to that of a modern blimp'.

### Sophisticated Design:

According to Dr. Pinotti, the huge 'Shakuna Vimana' described in the text 'might be defined as a cross between a plane and a rocket of our times and its design might remind one of today's space shuttle.'

'Surely, it expresses the most complex and sophisticated aeronautical designs among all the other descriptions of Vimanas mentioned in the 'Vymanika Shastra' he said. He described the author of the treatise 'Vymanika Shastra' as a man 'attempting to explain an advanced technology.'

Dr. Pinotti, who has made an exhaustive study of the history of Indian astronautics, said another text, 'Samarangana

Sustradhars' had 230 stanzas devoted to the principles of building Vimanas and their use in peace and war.

He said ancient aryanas knew the use of the element 'fire' as could be seen from their 'Astra' weapons that included Soposamhara (a flame belching missile), Prasvaponas (which caused sleep) and four kinds of Agni Astras that travelled in sheets of flame and produced thunder.

He said the car that was supposed to go up to Suryamandal (solar system) can not be dismissed as a myth because of the 'technical nature' of its description.

Dr. Pinotti said depictions of space travel, total destruction by incredible weapons and the fact that Vimanas resembled modern unidentified flying objects would suggest India had a superior but forgotten civilisation.

In the light of this, we think it will be better to examine the Hindu texts' and subject the descriptive models of Vimanas to more scientific scrutiny,' he said. - PTI".

These are the findings on the superiority of the ancient Hindus as revealed by the texts in India and presented before the scientists drawn from all over the world in a seminar, by a neutral foreigner. No reader can brush aside these as nothing. Something is there in our texts for the modern civilised world to probe more in depth and dig out more knowledge that is yet to be brought to surface.

The period of Rama can maintain the title of superiority if it is consistent with other similar disciplines of organised knowledge, and if it dovetails with them to give a consistent pattern of knowledge similar to the flying devices like vimanas. Science, medicine, surgery, machinery, satellites and their launching, communications, etc., are some of the other disciplines worth critical examination. Let us now look into these a bit closer.

#### **Medicine:**

In the field of medicine, people of that age had masterly control over the use of herbs. When the princes and a few vanaras lost consciousness in the battle field due to a missile of Indrajit, the right

herb was identified and brought in time to the site of victims. All those who lost consciousness regained it quickly.

#### Surgery:

In surgery, too, they attained supremacy. In the sloka 6, sarga 28, Sundara Kanda. Sita says.

नूनं ममाङ्गान्यचिरादनार्यः शस्त्रैः शितैश्छेत्स्यति राक्षसेन्द्रः ।  
तस्मिन्ननागच्छति लोकनाथे गर्भस्थजन्तोरिव शल्यकृन्तः ॥

"If my Lord Rama does not arrive in time to extricate me from this situation, like an unborn creature or child is extricated from the womb by surgery शल्यकृन्तः (salyakrintaha means by dictionary 'extraction of thorns, splinters or that part of surgery which relates to the extraction of extraneous matter from the body') surely and quickly, the king of rakshasas, Ravana, will out off my limbs by sharp instruments."

This is like the present day Caesariansurgery. By the employment of this simile, the poet has achieved another important purpose of communicating to the readers of his epic in later years, centuries and yugas, the message that the field of surgery during his time was supreme.

#### Engineering:

In the field of engineering, Valmiki has made a reference to machineries in sloka 33, sarga 61, Yudha Kanda एतत् समुच्छ्रितं यत्नं

"this is a gigantic machine".

This is said in comparing Kumbakarna to a machine and clearly indicates that in that age machinery was not only in vogue but also well known to the common man. There are one or two other instances in which Valmiki has used a simile referring to rotating wheels etc.

#### Satellites:

In Ramayana, the descriptions of the ashrams of great sages like Agastya, Vasishta, Bharadwaja, Viswamitra, etc., indicate that the excellent infrastructure that was available is beyond the imagination of our present civilisation. There was a shuttle launching pad, perhaps, similar to the one in Houston, USA. Sage Viswamitra was able to send Trisanku to the outer space, similar to sending manned space shuttles now. Viswamitra was able to communicate and hold dialogues with celestial inhabitants. Indra was able to stop Trisanku from



proceeding further. This reminds us about the present day star-war. Finally Trisanku was made to orbit the universe just like the present day satellites.

We know now that solar energy is necessary for a satellite. It must have been necessary also for Trisanku's satellite. This proves that the solar energy technique was very well known at that time.

#### Communication:

In the field of communications, there are a few instances where Valmiki had made some references to them.

To quote one instance of their supremacy in communication, Sri Rama left Ayodhya by about noon on Sunday the 16th February, 4409 B.C., i.e., Kara, Chaitra Sukla Dasami titi, Pushya Nakshatra on exile. Sri Rama instructed the charioteer to run the chariot very fast. He reached Sringeripura, Guha's place before dusk. But when he met Guha, Guha said that he already knew the overnight developments. He knew about the sudden departure of Sri Rama on exile by about noon. In fact, he was expecting the arrival of Sri Rama to his place.

Sri Rama was going by the fastest available mode of transport. Before he could reach Guha's place, Guha had already received the message and was preparing to receive Sri Rama.

Such was the quick communication available in that age. The author has identified a few more disciplines in which such supremacy is indicated; but it is not the intention of the author to write here another treatise within a treatise. Our objective now is to find out whether supremacy was there in that age in scientific knowledge.

In the astronomical and astrological fields also, indications are there, in Valmiki Ramayana, that the Hindus had superior knowledge as compared to our present race in this modern world. Their superiority would get well established beyond doubt if we calculate by a modern method and compare them with what has been handed over so gloriously by the Sage Valmiki to his posterity, i.e., the longitude of Kuja, Guru, Sukra and Sani. The modern methods take into account various major corrections as well as innumerable minor corrections due to perturbing causes. Nautical Almanac, Greenwich,

is the accepted international authority to have developed the most advanced astronomical techniques and necessary formulae for calculating the tropical longitudes of the planets, to a very great degree of accuracy required for researching astrologers, for whom such information is very vital and which information is otherwise difficult to obtain from any other source.

#### **Brief description of method.**

The position of a point on a sphere is defined with reference to two factors called co-ordinates; similarly the position of a point on a heavenly body in the celestial sphere is fixed with reference to two co-ordinates. In Hindu Astronomy and European Astronomy these two co-ordinates are called longitude and latitude. European or modern astronomy reckons longitude from a point (called the first point of Aries) which is one of the two points of intersection of the Celestial Equator with the Ecliptic. These two points are called Vernal and Autumnal Equinoxes. The European or modern longitude is called Celestial Longitude and the European or modern latitude is called Celestial Latitude.

Celestial Longitude of a body or a point is the arc of the ecliptic intercepted between the First point of Aries and a great circle passing through the poles of the ecliptic and the body or the point. This great circle is called a "Secondary to the Ecliptic". The Celestial Latitude of the body or the point is the arc (of the great circle passing through the poles of the ecliptic and the body or the point) intercepted between the ecliptic and the body or point i.e., in other words the celestial latitude is the arc of the secondary to the ecliptic intercepted between the ecliptic and the body or the point. The First point of Aries referred to above is moving from east to west and this movement is called the phenomenon of the precession of the Equinoxes or briefly 'precession'.

The European celestial longitude is now measured eastwards from the First Point of Aries, reckoning from  $0^{\circ}$  to  $360^{\circ}$ . The European Celestial latitude is measured from the ecliptic towards the poles of the ecliptic along the secondary to the ecliptic passing through the body or point, and is reckoned from  $0^{\circ}$  to  $90^{\circ}$ .

The European celestial latitude is northern or southern (i.e., positive or negative) according as it is measured from the ecliptic

towards the north pole of the ecliptic or south pole of the ecliptic. As the first point of Aries is moving, the European first point of longitude-reckoning is said to be movable point or in other words, the European beginning point of celestial longitude is said to be a "moving point".

The European sources mentioned above enable the calculation of the European celestial longitude from the vernal Equinox, which is called the "First Point of Aries". The European celestial longitude which is reckoned from the fixed first point of the constellational zodiac or the "first point of Mesham" is usually called Nirayana longitude. The distance (i.e., the angular distance along the ecliptic) between the "first point of Mesham" and "the First point of Aries" is usually called Ayanamsa. The tropical longitude is called Sayana longitude and the Indian longitude measured from the fixed "First point of Mesham" is called Nirayana longitude. So the difference between the Tropical longitude (i.e., Sayana longitude) and Nirayana longitude is called Ayanamsa.

#### **Plan of action:**

The formulae developed by Nautical Almanac has been reproduced by late C.G.Rajan in his wonderful book on the calculation of planetary positions for 6300 years. Unfortunately this book is out of print now, but the author of this book possesses one for the last five decades. The original formulae as adopted by C.G.Rajan in his book is furnished under Section I of each planet in Chapter V. C.G.Rajan has developed Tables and given the longitudes etc., only up to 3200 B.C. But we require these for earlier periods also. With the help of the formulae given by C.G.Rajan, the author has prepared the longitudes, latitudes etc., up to 5000 B.C. These are furnished in Table I of the respective planets in Chapter V.

Our objective is to calculate the longitudes of planets on the day of Sri Rama's birth and the source is the formulae of the Nautical Almanac. Making use of these, we can achieve our objective. To achieve the objective, the plan of action, in brief, is as follows:

**Kuja, Budha, Guru, Sukra and Sani:**

In calculating the Nirayana longitudes of the above five planets, the following procedure is adopted according to the practice of modern astronomy.

First, the heliocentric longitudes and latitudes of the planets are calculated as per Nautical Almanac, Greenwich.

Next, the geocentric longitudes and latitudes are also calculated, as per Nautical Almanac, Greenwich.

Finally Ayanamsa is applied to get the Nirayana longitude.

**Explanation:**

Heliocentric longitude of a planet means the longitude of a planet as seen from the centre of the Sun.

Heliocentric latitude of a planet means the latitude of the planet as seen from the centre of the Sun.

Geocentric longitude of a planet is with reference to the centre of Earth i.e., as seen from the centre of Earth.

Geocentric latitude of a planet means the latitude of the planet as seen from the centre of the Earth.

As the Sun is the centre of the Solar system, the longitude and latitude of a planet are first found for the sake of accuracy with reference to the Sun and then they are converted into longitude and latitude with reference to the Earth.

For our mundane purposes (including astronomical and astrological purposes), we require geocentric longitudes and geocentric latitudes of planets.

The geocentric longitudes obtained as above are as per Sayana System, i.e., Tropical System. To convert this into Nirayana System, we require Ayanamsa.

To find the geocentric longitude and latitude of a planet from its heliocentric longitude and latitude:

- Let  $S$  be the longitude of Sun,
- Let  $R$  be the radius vector of the Sun,
- Let  $H$  be the heliocentric longitude of a planet,
- Let  $b$  be the heliocentric latitude of the planet,
- Let  $r$  be the radius vector of the planet,
- Let  $x$  be the geocentric longitude,
- Let  $y$  be the geocentric, latitude.

N.B. Northern latitude is positive, Southern latitude is negative  
(both Heliocentric and Geocentric)

$$\text{then } \tan P = \frac{r \cos b. \sin (H-S)}{R + r \cos b. \cos (H-S)} = \frac{V}{W} \quad (\text{say}) = \tan a.$$

— Formula 1

$$\text{Here } r \cos b. \sin (H-S) = V$$

$$R + r \cos b. \cos (H-S) = W$$

If V is positive and w is positive, then  $P = a$

If V is positive and W is negative, then  $P = 180^\circ - a$

If V is negative and W is negative, then  $P = 180^\circ + a$

If V is negative and W is positive, then  $P = 360^\circ - a$ .

The geocentric longitude  $x = S + P$ .

— Formula 2

Latitude:

If y is geocentric latitude,

$$\tan y = \frac{r \sin b. \sin P}{R + r \cos b. \sin (H-S)} = \frac{C}{V} \quad \text{— Formula 3}$$

$$\tan y = \frac{r \sin b. \cos P}{R + r \cos b. \cos (H-S)} = \frac{D}{V} \quad \text{— Formula 4}$$

The formula 3 is used when P is near  $90^\circ$  or  $270^\circ$

i.e., when P is between  $45^\circ$  and  $135^\circ$  or  $225^\circ$  and  $315^\circ$

The formula 4 is used when P is near  $0^\circ$  or  $360^\circ$

i.e., when P is between  $315^\circ$  and  $45^\circ$  or  $135^\circ$  and  $225^\circ$

If C and V are both positive or both negative the latitude is Northern.

If D and W are both positive or both negative, the latitude Y is Northern.

If in C and V, one is positive and the other is negative, the latitude Y is Southern.

If in D and W, one is positive and the other is Negative, the latitude Y is Southern.

If  $S, R, H, b, r$  are known (or given) then  $\chi$  and  $y$  can be found from the four formulae given, i.e., if we want to find the geocentric longitude and latitude of a planet for a required time, we must first find out  $S$ , the longitude of Sun and  $R$ , Radius vector of the Sun for the required time.

N.B.: Figures in degrees represent the remainder in degrees after dividing by  $360^\circ$  and leaving out the integer.



*Father is our master; nay, he is our supreme deity. He alone will be our husband, to whom father will give us away.*

*Balakanda - Canto 33  
Verse 21*

*In case, however, of virtuous women, who are in fact devoted to good conduct, truthfulness and the precepts of their elders and keep within the bounds of decorum their husband is the most sacred object and he above excels all*

*Ayodhya Kanda - Canto 39 - Verse 24*

*Swans full of joy descend into rivers from which mud has altogether disappeared which are now fringed with sands whose waters have become clear which are frequented by herds of cows and flocked with cranes and are rendered noisy with their cries.*

*Kishkinda Kanda - Canto 30 - Verse 42*

## CHAPTER IV

### AYANAMSA.

AYANAMSA is required to convert Tropical (Sayana) Longitude into Siderial (Nirayana) Longitude. Since over a century ago, Indian astrologers have started to employ European Almanacs for the preparation of Hindu almanac called Drig-Ganitha Panchang for astrological purposes, since European Almanacs give accurately the longitudes of planets according to the Sayana System. If the ayanamsa quantity is correctly known, the Nirayana longitude, that is required for Nirayana system, can be easily obtained by subtracting or adding the Ayanamsa quantity from or to the Sayana longitude. Since we have proposed to find the longitudes of the planets in the Sayana system first and then convert them into the Nirayana system, we must know the Ayanamsa. In our present case, it has become easy to know whether the ayanamsa we have arrived at after some calculations according to Vedanga Jyotisha is correct. Valmiki has already given the Nirayana longitudes of all the planets except Budha correct to the second. Therefore when we calculate the Sayana longitudes and apply this ayanamsa the results must tally with the longitudes given by Valmiki. If they tally correct to the degree, we can take it that the ayanamsa calculated and adapted is correct.

Calculation of Ayanamsa according to Vedanga Jyotisha:

According to Vedanga Jyotisha

"the Winter Solstice was in the beginning of Sravishta (divisional).

The first year of the cycle commenced with the Winter Solstice when the Sun and the Moon were together at the beginning of Dhanishta and the Uttarayana also began at the same time".

(Vide page 38 of the "the Orion" by the late Bala Gangadara Tilak).

The beginning of Sravishta or Danishta (Tamil Avittam) is identified with Alpha Delphini. The right ascension and declination of Alpha Delphini were 20hrs. 36min. 9secs. of time and  $15^{\circ} 38' 41''$  of arc North respectively on 13.4.1925 and so tropical longitude of the star becomes  $316^{\circ} 20'$ .

The beginning of Dhanishtha is  $293^{\circ} 20'$  according to the Indian Siderial longitude. As the Winter Solstice (i.e.,  $270^{\circ}$  tropical longitude) is said to have coincided with beginning of Dhanishtha which is  $293^{\circ} 20'$  (of the Indian Siderial longitude) it is clear that the European First Point of Aries or the European starting point (or the zero degree of Sayana System) was  $23^{\circ} 20'$  (i.e.,  $293^{\circ} 20'$  minus  $270^{\circ}$ ) to the east of the Indian starting point or the beginning of Mesham (or the zero degree of Nirayana System). At the present times, the European First Point of Aries is decidedly to the west of the Indian starting point. In 1925 A.D., the tropical longitude of the beginning of Danishtha or Alpha Delphini was  $316^{\circ} 20'$  and the tropical longitude of this star was  $270^{\circ} 0'$  in the Vedanga Period. Thus since the Vedanga period, this star has increased in its longitude by  $46^{\circ} 20'$  (i.e.,  $316^{\circ} 20'$  minus  $270^{\circ} 0'$ ). This increase is due to the westward motion of the European starting point and to the very small eastward motion of the star. Taking the annual proper motion of this star to be almost uniform and equal to  $+0.0705$  seconds of arc (i.e.,  $+0.0047$  seconds of time) and taking the rate of the European starting point (or the precession of the equinoxes as it is called) to be  $50''.2564 + 0''.0002225 t$  where  $t$  is the number of years from 0 day, 1900 A.D., and is positive after 1900 A.D., and negative before 1900 A.D., we shall find out the period during which this increase of  $46^{\circ} 20'$  has occurred i.e., in other words, we shall find out the time when the winter Solstice coincided with Alpha Delphini.

The rate of precession for 1900 A.D.

$$= 50''.2564 + 0''.0002225 t.$$

Therefore, the precession for 1925 A.D.

$$= 50''.2564 + 0''.0002225 \times 25 \\ = 50''.26196.$$

So the rate of precession for 1925 A.D.

$$= 50''.26196 + 0''.0002225 \times n$$

where  $n$  is reckoned from 1925 A.D., and is positive for years after 1925 A.D., and negative before 1925 A.D.

The increase of  $46^{\circ} 20'$  is due to the accumulated sum of the precessions for the several years before 1925 A.D., and to the accumulated sum of the annual proper motion of the star for the same number of years before 1925 A.D. Let the number of years be  $n$ .



The annual proper motion of the star is  $0''.0705$ .

$$\begin{aligned} \text{Then } 46^\circ 20' &= (50'' .26196 - 0''.0002225n) \text{ to } n \text{ terms (1)} \\ &\quad + 0''.0705 \text{ to } n \text{ terms (2).} \\ &= (50'' .26196 - 0''.0002225n) \text{ to } n \text{ terms} \\ &\quad (1) + 0''.0705n \text{ (2).} \end{aligned}$$

Now combining (1) and (2) we have,

$$\begin{aligned} 46^\circ 20' &= \text{the sum of } (50''.33246 - 0''.0002225n) \text{ } n \text{ terms,} \\ \text{where } 50''.33246 &= 50''.26196 + 0''.0705. \end{aligned}$$

Now the sum of  $(50''.33246 - 0''.0002225n)$  to  $n$  terms is the sum  $S$  of an arithmetical series, the 1st term  $a$  of which is  $50''.3322375$  i.e.,  $50.33246 - 0.0002225$  and the common difference  $d$  is  $-0.0002225$ . The formula for the sum of an arithmetical series is

$S = \frac{n}{2} [2a + (n-1)d]$  or  $S = \frac{n}{2} (a+l)$  where  $S$  is the sum,  $n$  is the number of terms,  $a$  is the 1st term of the series,  $d$  is the common difference between any two consecutive terms and  $l$  the last or the  $n$ th term. Here  $a = 50''.3322375$  and  $d = -0''.0002225$ .

$$\text{Therefore, } 46^\circ 20' = S = \frac{n}{2} (2 \times 50''.3322375 - (n-1) 0''.0002225)$$

$$\text{Therefore, } 46^\circ 20' = 50''.332375 n - \frac{n(n-1)}{2} 0''.00011125.$$

$$\text{Therefore, } 46^\circ 20' = 50''.33234875n - 0''.00011125 n.$$

$$\text{But } 46^\circ 20' = 166800 \text{ secs. So by transposition we have,}$$

$$0''.00011125n^2 - 50''.33234875n + 166800 = 0$$

This is a quadratic equation and  $n$  will have two values.

In a quadratic equation of the form  $an^2 + bn + c = 0$

$$\begin{aligned} n &= \frac{-b \pm \text{root of } (b^2 - 4ac)}{2a} \\ &= \frac{-(-50''.33234875) \pm \text{root of } [(50.33234875)^2 - (4 \times 0.00011125 \times 166800)]}{2 \times 0.00011125} \end{aligned}$$

$$\text{Therefore, } n = \frac{50.33234875 \pm 49.589}{0.0002225}$$

$$= \frac{0.74334875 \text{ or } 99.92134875}{0.0002225}$$

Therefore,  $n = 3339$  or  $449084$ .

So taking 3339 we have  $n = 3339$  i.e., the number of years required is 3339 years from 1925 backwards.

So the coincidence of the Winter Solstice with Alpha Delphini took place in 3339 years before 1925 A.D. i.e., 1414 B.C. (i.e.,  $3339 - 1925$ ). So in 1414 B.C., the European Starting Point was  $23^\circ 20'$  (i.e.,  $293^\circ 20'$  minus  $270^\circ 0'$ ) to the east of the Indian starting point or in other words the ayanamsa in 1414 B.C., was  $-23^\circ 20'$  and the winter Solstice coincided with Alpha Delphine or the beginning of Dhanishtha in about 1414 B.C.

#### Calculation of Ayanamsa for 4433 B.C.

Now, we shall calculate the Ayanamsa in 4433 B.C., which is the year of Sri Rama's birth.

(a) We require for this the year of Soonya Ayanamsa or zero Ayanamsa or when did the coincidence of the European Starting Point and the Indian Starting Point take place.

Now, the ayanamsa for 1925 is  $22^\circ 56' 4''.61$  and the rate of precession in 1925 is  $50''.26196 \pm 0.0002225n$ , where  $n$  is the number of years from 1925 and is positive after 1925 and negative before 1925. Let the year of coincidence be  $n$  years before 1925; then we have,

$$22^\circ 56' 4''.61 = n/2 [2a + (n-1) d] \text{ where } a = 50''.26173751, d = -0''.0002225$$

Therefore,  $22^\circ 56' 5''$  (nearly)

$$= n/2 [2 \times 50.2617375 - (n-1) 0.0002225]$$

$$82565 = 50.26184875n - 0.00011125n^2 + 0.00011125n.$$

$$0.00011125n^2 - 50.26184875n + 82565 = 0$$

So applying the formula as before, we get,

$$n = \frac{50.26184875 \pm \text{root of } [(-50.26184875)^2 + 4 \times 0.00011125 \times 82565]}{2 \times 0.00011125}$$

$$n = \frac{50.26184875 \pm 49.896}{0.0002225}$$

Taking  $n = \frac{50.26184875 - 49.896}{0.0002225}$ , we have  $n = 1644$  nearly.

Therefore, the coincidence took place 1644 years before 1925 i.e., 281 A.D. So the year of Soonya Ayanamsa is 281 A.D.

|                           |   |
|---------------------------|---|
| Subtracting one cycle     | 1644 years                                    |
|                           | 1363 B.C. Ayanamsa is $22^{\circ} 56' 4''.61$ |
| Subtracting another cycle | 3007 years - Ayanamsa is 0                    |
| Subtracting another cycle | 4651 years - Ayanamsa is again                |
|                           | $22^{\circ} 56' 4''.61$                       |
| Required year             | 4433 B.C.                                     |
| Difference                | 218 years.                                    |

The general equation for ayanamsa for any year is,

$22^{\circ} 56' 4''.61 \pm n/2 [2a + (n-1)d]$  where  $n$  is the number of years from 1925 A.D.,  $a = 50''.2621825$ .

Substituting the above values,

$$22^{\circ}.934614 - \frac{218}{2} + [2 \times 50.26211825 + 217 \times 0.0002225] \times \frac{1}{3600}$$

$$22^{\circ}.934614 - 3^{\circ}.0450946 = 19^{\circ}.891045$$

As the year 4433 B.C. falls within the 1st quadrant, the movement is to east and so the Ayanamsa  $19.89105$  is to be added to the Sayana longitude. This Ayanamsa is arrived at by the Libratory theory, where the motion is not continuous but oscillating, leaving alone any controversy about the scientific character of this in modern times.

Let us now consider the other views on Ayanamsa of Precession, which support the Libratory theory and calculate our required Ayanamsa for 4433 B.C., which is the year of birth of Sri Rama.

During a symposium on the vexed question of "Ayanamsa" or "Precession of the equinoxes", Sri L. Narayana Rao has presented a paper bearing No. 10. This is published in pages 221 to 225 in the Astrological magazine of February 1963 issue. The following is an extract for the ready reference of the readers.

"Surya Sidhanta":- At the time of creation and also at the commencement of a Mahayuga the intersectional line of

equinoxes of the equatorial and ecliptic circles occupies the zero position or conversely the first point of Aries of the moving zodiac coincides with the first point of the fixed zodiac or Nirayana Meshadi. Then it traces  $27^\circ$  to the east in 1800 years, then retraces by gradual decrease reaching the zero position in the next 1800 years, then it goes behind  $27^\circ$  in the west decreasing algebraically in 1800 years and again increasing from  $-27^\circ$  to 0, in the last phase of 1800 years. Thus in the course of 7200 years  $108^\circ$  is traced by the equinoctial line and in a Mahayuga this repeats 600 times.

### Formula 1

Multiply the number of days elapsed in Mahayuga by 600 and divide it by the number of days in a Mahayuga. The quotient will be revolutions; reduce the balance to signs, degrees, minutes and seconds. Find the Sine argument thereof. Multiply this by 3 and divide by 10 which is  $108/360$ . This will be the amount of precession for any year. For 600 revolutions = 4320000 years (a Mahayuga).

1 revolution = 7200 years.

We want for 1962 commencement of the Hindu Solar year. Kali year =  $1962 - 78 + 3179 = 5063$ .

Previous yuga's total being a multiple of 7200 they are of no use; we may take 1800 for each quarter. We are thus left with  $5063 - 2(1800)$  and we get remaining 1463.

$$\text{Angle traced} = \frac{90 \times 1463}{1800} = 73^\circ.15$$

being less than  $90^\circ$  the Sine argument is itself:

Multiplying this by 3 and dividing by 10 we get

$$\frac{73.15 \times 3}{10} = 21.945 = 21^\circ 56' 42''.$$

As two quadrants of  $90^\circ$  each have passed, we are in the 3rd quadrant, i.e., receding from  $0^\circ$  to  $-27^\circ$ , the amount of precession is negative, i.e., the first point of Aries has moved behind the first point of Aries of the fixed zodiac by  $21^\circ 56' 42''$ .

This is the Libratory theory There is lot of controversy about the scientific character of this but even in the other theory there is a similar indication even granting that there is no oscillatory motion by a continuous motion. That is, the precession takes a value of  $90^\circ$  as maximum in the first quadrant; after it passes  $90^\circ$  for getting declination etc., we use  $\sin(90^\circ + x) = \sin[180^\circ - (90 - x)] = \sin(90 - x)$  i.e., the sine argument in the second quadrant will be the supplement or of an angle equivalent to  $x$ ; from the Libra point in the reverse direction ( $x$ ). Perhaps this was what was in their minds when they advocated the oscillatory motion; still they have limited the maximum value to  $27^\circ$  either side, disregarding the sign. It is only time and future observations beyond the year 5400 Kali (2298 A.D.) that will have to prove how far the Hindu belief of the character of the Ayana-Chalana is true. A simple method (for the present era between 3600 - 5400) for calculating Ayanamsa is:-

#### Formula 2

Subtract 3600 from the kali year, multiply the balance by 3 and divide by 200; the quotient will be the Ayanamsa in degrees.

Example Kali 5063; Ayanamsa

$$= \frac{(5063 - 3600)}{200} \times 3 = \frac{1463 \times 3}{200} = \frac{43.89}{2}$$

$$= 21^\circ 56' 42''$$

#### AYANAMSA FOR 4433 B.C.

Now let us calculate the Ayanamsa for 4433 B.C., as per the two formulae described above.

#### Formula 1.

Sri Rama's birth year  
Kali year 3102 B.C.

4433 B.C.

3102 B.C.

Balance

1331 years

As 1331 is within one quarter of 1800 years, the multiples need not be calculated.

$$\text{Angle traced} = \frac{100}{90 \times .1331} = 66^\circ.55$$

Since  $66^\circ.55$  is less than  $90^\circ$ , the sine argument is itself;

$$\text{So Ayanamsa} = \frac{66^\circ.55 \times 3}{10} = 19^\circ.965$$

Since 1331 is less than 1800 and is in the first quadrant from the Kali year, it traces to the east for the first 1800 years. So the amount of precession is positive i.e., the first point Aries has advanced from the original point of Aries of the fixed zodiac by  $19^\circ.965$ .

Formula 2.

A simple method for calculating Ayanamsa is

Subtract the required year from the Kali year;

Multiply the balance by 3 and divide by 200;

the quotient will be the Ayanamsa in degrees;

Sri Rama's birth

year 4433 B.C.

Kali year 3102 B.C.

Balance years 1331

$$\text{Ayanamsa} = \frac{1331 \times 3}{200} = 19^\circ.965 \text{ or } 19^\circ 57' 54''$$

#### OBSERVATION:

In the above investigations, we have obtained two values of Ayanamsa for 4433 B.C., by two different sidhantas. They are,

By Vedanga Jyothisha  $19^\circ.891045$

By Surya Sidhanta;

Formula 1  $19^\circ.965$

Formula 2  $19^\circ.965$

No doubt, the difference between the two is very negligible, especially when calculating for periods of a very remote past. However, it is desirable to be precise in our results. In the present case, it is very easy to find out the precise value.

Sayana longitudes of these planets by the modern method as adopted by Nautical Almanac of Greenwich. The difference between these two should be the Ayanamsa for 4433 B.C. This difference must be the same or very near to our values calculated as above. If it is so, our values must be correct. Let us now have a look into this.

| Planet. | Sayana Longitude<br>as per Nautical<br>Almanac | Nirayana Longitude<br>as given by Valmiki | Difference between<br>the columns 2 & 3<br>is Ayanamsa |
|---------|--|---|--|
|         | o  | o   | o  |
| (1)     | (2)  | (3)                                       | (4)  |
| Kuja    | 278.03504                                      | 298.0                                     | 19.96496   |
| Guru    | 70.035083                                      | 90.000278                                 | 19.965195  |
| Sukra   | 337.03951                                      | 357.00                                    | 19.96049   |
| Sani    | 180.07248                                      | 200.00                                    | 19.92752   |

It may be observed that the Ayanamsa arrived at above is within the belt of 19.93 and 19.965195. Our results also are within the belt of 19.92 and 19.965. The value of 19.965 is more realistic.

So we can adopt the Ayanamsa for 4433 B.C. as 19°.965



*The sound of the water flowing in rivers, the water discharged by clouds and the murmur of the water gushing from springs, the sound of furious winds, the cries of peacocks and the croaks frogs, that are bereft of joy, have completely vanished now, to be sure.*

*- Kishkinda Kanda - Canto 30 - Verse 43*





*Conduct alone proclaims a man to be well-born or otherwise, gallant or only fancying himself to be gallant, honest or dishonest.*

*- Valmiki Ramayana - Ayodhya Kanda  
- Canto 109 - Verse 4*

## CHAPTER V

### CALCULATION OF LONGITUDES AND LATITUDES OF PLANETS AT THE TIME OF THE BIRTH OF SRI RAMA

To find the longitude and latitude of the Moon at 17 hours. 23 minutes, 5 seconds, LMT., at Ayodhya, India, on 11th February, 4433 B.C., i.e., 12 Noon Greenwich Mean time first and then finding out the longitude and latitude at Sri Rama's Birth Time of 10 h., 47 m., LMT at Ayodhya on the 11th February. 4433 B.C.

Part I:

The columns denoted by L, M, and V in the following Table V.1. give the values of the Mean Longitude of the Moon for centuries.

Mean anomaly of the Moon and the difference of the Mean longitude of the node to  $360^\circ$ , denoted by V.

These are prepared from the following formulae.

Let L be the mean longitude of the Moon in its undisturbed orbit.

Let Z be the mean longitude of the Moon's ascending node.

Let P be the longitude of the Moon's perigee in its undisturbed orbit.

Let W be the distance of the perigee from the node in Undisturbed orbit.

Let T be the time reckoned in Julian centuries of 36525 days from the epoch 3200 B.C., January, 0.5 day i.e., noon Greenwich and 17 h. 23 m. 5 secs. L.M.T. at Ayodhya, India.

$$L = 219^\circ.3086 - (1336_r) 307^\circ 53' 26.06'' T + 7''.14 T^2 + 0''.0068 T^3$$

$$T^3 = Z + w + M \text{ - formula 1}$$

$$P = 334^\circ 19' 46''.4 - (11_r) 109^\circ 02' 02''.52 T - 37''.17 T^2 - 0''.045 T^3$$

$$= Z + W \text{ - Formula 2}$$

$$\text{So } L = 219^\circ.3086 + (1336_r) 307^\circ.89057222222 T + 0^\circ.00918333333 T^2$$

$$+ 0^\circ.00000188 T^3$$

$$1058830 \text{ for } 1900 \text{ AD, } 294^\circ 56' 98''$$

Putting  $l = (1336_r) 307^\circ 53' 26''.06 T$ , we have

for one century of 25 leap years,  $l = (1336_r) 307^\circ.8905722222$

for one century of 24 leap years,  $l = (1336_r) 294^\circ.71417549197$

for one ordinary year of 365 days,  $l = (13_r) 129^\circ.38480654125$

for one day in an year of 365 days,  $l = 13^\circ.17639673025$

In the motion of M, putting  $a = (1325_r) 198^\circ 51' 23'', 54 T$ ,

we have

for one century of 25 leap years,  $a = (1325_r) 198^\circ.85653869325$

for one century of 24 leap years,  $a = (1325_r) 185^\circ.79154604332$

for one ordinary year of 365 days,  $a = (13_r) 88^\circ.72231722445$

In the motion of V, putting  $b = (5_r) 134^\circ 08' 31''.23 T$ , we have

for one century of 25 leap years,  $b = 134^\circ.142008355$

for one century of 24 leap years,  $b = (5_r) 134^\circ.08905443280$

for one ordinary year of 365 days,  $b = 19^\circ.321816030$

$$M = 44^\circ.2561 + (1325_r) 198^\circ.85653869325 T + 44''.31 T^2 + 0''.0518 T^3$$

$$V = 259^\circ 12' 35''.11 - 6962911''.23 T + 7''.48 T^2 + 0''.008 T^3 \quad (1900 \text{ AD})$$

$$3200 \text{ AD } 100.2729$$

TABLE V.1.

## MOON

| B.C. Years | L<br>o   | M<br>o   | V<br>o   |
|------------|----------|----------|----------|
| 3200       | 219.3086 | 44.2561  | 100.2729 |
| 3300       | 271.4181 | 205.3997 | 326.1309 |
| 3400       | 323.5276 | 6.5432   | 191.9889 |
| 3500       | 15.6371  | 167.6867 | 54.8469  |
| 3600       | 67.7466  | 328.8302 | 283.7049 |
| 3700       | 119.8561 | 129.9737 | 149.5629 |
| 3800       | 171.9656 | 291.1172 | 15.4209  |
| 3900       | 224.0751 | 92.2607  | 241.2789 |
| 4000       | 276.1846 | 253.2042 | 107.1369 |
| 4100       | 328.2941 | 54.5477  | 332.9949 |
| 4200       | 20.4036  | 215.6912 | 198.8529 |
| 4300       | 72.5131  | 16.8347  | 64.7109  |
| 4400       | 124.6226 | 177.9782 | 290.5689 |
| 4500       | 176.7321 | 339.1217 | 156.4269 |
| 4600       | 228.8416 | 140.2642 | 22.2849  |
| 4700       | 280.9511 | 301.4087 | 248.1429 |
| 4800       | 333.0606 | 102.5522 | 114.0009 |
| 4900       | 25.1701  | 263.6957 | 339.8589 |
| 5000       | 77.2796  | 64.8392  | 205.7169 |

min 1900 AD  
220° 97832

## MOON

Table 2.

## Secular Variation - Part 1.

| B.C. Years | L<br>o | M<br>o  | V<br>o |
|------------|--------|---------|--------|
| 3200       | 4.957  | 30.77   | -5.192 |
| 3300       | 5.378  | 32.1202 | -5.402 |
| 3400       | 5.799  | 33.4705 | 5.616  |
| 3500       | 6.22   | 34.8207 | 5.833  |
| 3600       | 6.641  | 36.1709 | 6.054  |
| 3700       | 7.062  | 37.5212 | 6.28   |
| 3800       | 7.483  | 38.8715 | 6.516  |
| 3900       | 7.903  | 40.2217 | 6.743  |
| 4000       | 8.324  | 41.572  | 6.98   |
| 4100       | 8.745  | 42.9222 | 7.222  |
| 4200       | 9.166  | 44.2725 | 7.468  |
| 4300       | 9.587  | 45.6227 | 7.717  |
| 4400       | 10.008 | 46.973  | 7.970  |
| 4500       | 10.429 | 48.3225 | 8.223  |
| 4600       | 10.85  | 49.6725 | 8.480  |
| 4700       | 11.271 | 51.0237 | 8.740  |
| 4800       | 11.692 | 52.374  | 9.005  |
| 4900       | 12.113 | 53.7242 | 9.274  |
| 5000       | 12.534 | 55.0745 | 9.546  |

## MOON

Table 3.

## Secular Variation - Part 2.

| B.C. Years | L<br>o | M<br>o | U<br>o |
|------------|--------|--------|--------|
| 3200       | 0.236  | -5.192 | 0.2778 |
| 3300       | 0.250  | 5.408  | 0.2949 |
| 3400       | 0.265  | 5.616  | 0.3127 |
| 3500       | 0.2816 | 5.833  | 0.3313 |
| 3600       | 0.2984 | 6.054  | 0.3507 |
| 3700       | 0.3161 | 6.280  | 0.3709 |
| 3800       | 0.3347 | 6.516  | 0.3920 |
| 3900       | 0.3542 | 6.743  | 0.4140 |
| 4000       | 0.3746 | 6.980  | 0.8643 |
| 4100       | 0.3959 | 7.222  | 0.6668 |
| 4200       | 0.4181 | 7.468  | 0.6915 |
| 4300       | 0.4412 | 7.717  | 0.7172 |
| 4400       | 0.4652 | 7.970  | 0.7439 |
| 4500       | 0.4902 | 8.225  | 0.7706 |
| 4600       | 0.5162 | 8.480  | 0.7974 |
| 4700       | 0.5432 | 8.740  | 0.8243 |
| 4800       | 0.5712 | 9.005  | 0.8513 |
| 4900       | 0.6002 | 9.274  | 0.8793 |
| 5000       | 0.6302 | 9.546  | 0.9083 |

## MOON

Table 4

Secular variation for perturbances A to E from 3200 B.C. - Part 1.

| B.C. Years | A |       | B |        | C |        | D |       | E |        |
|------------|---|-------|---|--------|---|--------|---|-------|---|--------|
|            | o |       | o |        | o |        | o |       | o |        |
| - 3200     | - | 22.03 | + | 10.51  | - | 0.4974 | - | 19.76 | + | 11.01  |
| - 3300     |   | 22.94 |   | 10.928 |   | 0.5174 |   | 20.55 |   | 11.449 |
| - 3400     |   | 23.88 |   | 11.355 |   | 0.5378 |   | 21.36 |   | 11.897 |
| - 3500     |   | 24.85 |   | 11.792 |   | 0.5580 |   | 22.20 |   | 12.354 |
| - 3600     |   | 25.84 |   | 12.238 |   | 0.5798 |   | 23.06 |   | 12.819 |
| - 3700     |   | 26.85 |   | 12.692 |   | 0.6014 |   | 23.93 |   | 13.291 |
| - 3800     |   | 27.88 |   | 13.159 |   | 0.6234 |   | 24.83 |   | 13.771 |
| - 3900     |   | 28.93 |   | 13.625 |   | 0.6458 |   | 25.75 |   | 14.260 |
| - 4000     |   | 30.01 |   | 14.014 |   | 0.6686 |   | 26.65 |   | 14.757 |
| - 4100     |   | 31.12 |   | 14.591 |   | 0.6918 |   | 27.65 |   | 19.087 |
| - 4200     |   | 32.26 |   | 15.087 |   | 0.7157 |   | 28.64 |   | 20.32  |
| - 4300     |   | 33.33 |   | 15.591 |   | 0.7400 |   | 29.65 |   | 20.842 |
| - 4400     |   | 34.55 |   | 16.104 |   | 0.7647 |   | 30.67 |   | 21.372 |
| - 4500     |   | 35.84 |   | 16.227 |   | 0.7838 |   | 31.71 |   | 21.909 |
| - 4600     |   | 37.17 |   | 17.159 |   | 0.8155 |   | 32.78 |   | 22.463 |
| - 4700     |   | 38.50 |   | 17.699 |   | 0.8416 |   | 33.86 |   | 23.017 |
| - 4800     |   | 39.86 |   | 18.248 |   | 0.8681 |   | 34.96 |   | 23.579 |
| - 4900     |   | 41.25 |   | 18.798 |   | 0.8950 |   | 36.11 |   | 24.148 |
| - 5000     |   | 42.67 |   | 19.357 |   | 0.9223 |   | 37.26 |   | 24.725 |

## Secular variation for perturbances A to E from 3200 B.C. - Part 2.

| B.C. Years | A<br>o  | B<br>o   | C<br>o | D<br>o<br>+ | E<br>o  |
|------------|---------|----------|--------|-------------|---------|
| - 3200     | + 1.421 | - 0.3768 | 0.0000 | 1.4210      | 0.3768  |
| - 3300     | 1.5103  | 0.399    | "      | 1.5070      | 0.3999  |
| - 3400     | 1.6036  | 0.4654   | "      | 1.5960      | 0.4239  |
| - 3500     | 1.6969  | 0.5340   | "      | 1.6910      | 0.4488  |
| - 3600     | 1.7937  | 0.6092   | "      | 1.7860      | 0.04745 |
| - 3700     | 1.8937  | 0.6844   | "      | 2.7710      | 0.5011  |
| - 3800     | 1.9972  | 0.7625   | "      | 2.8730      | 0.5286  |
| - 3900     | 2.1047  | 0.8433   | "      | 2.978       | 0.5570  |
| - 4000     | 2.2157  | 0.9297   | "      | 3.086       | 0.5863  |
| - 4100     | 2.3302  | 1.0161   | "      | 3.197       | 0.6165  |
| - 4200     | 2.4487  | 1.1054   | "      | 3.311       | 0.6476  |
| - 4300     | 2.5547  | 1.1964   | "      | 3.4285      | 0.6795  |
| - 4400     | 2.6807  | 1.2903   | "      | 3.5485      | 0.7123  |
| - 4500     | 2.8107  | 1.3869   | "      | 3.6715      | 0.7460  |
| - 4600     | 2.9447  | 1.4864   | "      | 3.7975      | 0.7804  |
| - 4700     | 3.0862  | 1.5886   | "      | 3.9270      | 0.8157  |
| - 4800     | 3.2277  | 1.6937   | "      | 4.0595      | 0.8519  |
| - 4900     | 3.3727  | 1.8015   | "      | 4.1955      | 0.8890  |
| - 5000     | 3.5217  | 1.9120   | "      | 4.3345      | 0.9270  |

Figures for 1900 AD are calculated, written in hand.

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## MOON

### IMPORTANT PERTURBANCES

Regarding some of the important perturbances caused by the attraction of the Sun and the planets on the Moon, the formulae given in pages 5 to 15 of Hansen's Tables De La Lune are as follows:-

*51 Centuries - 13 days -*

I. For 3200 B.C. 0.5 day ie. Noon Greenwich Mean Time

$$A = 248^{\circ}.2216 + (1148_r) 55^{\circ}.37787761 T + 0^{\circ}.00881085 T^2$$

*216.91914 - 147.11458 = 69.80456*

$$= 69.80456 + 0^{\circ}.000011374958 T^3$$

$$B = 292^{\circ}.4778 + (2473_r) 254^{\circ}.23441630 T + 0^{\circ}.00420645$$

*309.77382 - 316.95948 = -7.18566*

$$= -7.18566 + 0^{\circ}.00000301393 T^3$$

$$C = 239^{\circ}.477 + (99_r) 359^{\circ}.0551667 T + 0^{\circ}.0001988055 T^3$$

*213.34593*

$$D = 188^{\circ}.7439 + (1048_r) 56^{\circ}.32271091 T + 0^{\circ}.007903044$$

*203.26724 - 12.81281 = 190.45443*

$$= 190.45443 + 0^{\circ}.000011374958 T^3$$

$$E = 233^{\circ}.00 + (2373_r) 255^{\circ}.17924960 T + 0^{\circ}.004405255 T^2$$

*218.59980 - 304.14668 = -85.54688*

$$= -85.54688 + 0^{\circ}.00000301393 T^3$$

$$F = 332^{\circ}.9044 + (1131_r) 172^{\circ}.20183595 T + 0^{\circ}.00430092$$

*126.82875 - 144.97792 = -18.14917*

$$= -18.14917 + 0^{\circ}.000003347264 T^3$$

To find out the position for 4400 B.C., substitute T by 12 centuries from 3200 to 4400 B.C. to get the following

|   |           | 33.1342465<br>x Annual<br>motion | Sum       | Secular<br>Part 1 | Correc-<br>tion<br>Part 2 | Sum       |
|---|-----------|----------------------------------|-----------|-------------------|---------------------------|-----------|
|   |           | o                                | o         | o                 | o                         | o         |
| A | 303°.6868 | 250.19136                        | 193.87816 | -34.55            | +2.6807                   | 162.00886 |
| B | 121°.665  | 309.92976                        | 71.59476  | +16.104           | -1.2903                   | 86.40846  |
| C | 250°.8153 | 39.8188                          | 290.63418 | -0.7647           | +0.0000                   | 289.86948 |
| D | 232°.8718 | 258.6672                         | 131.539   | -30.67            | +3.5485                   | 104.4175  |
| E | 50°.8499  | 318.4056                         | 9.2555    | +21.372           | -0.7123                   | 30.55627  |
| F | 66°.4829  | 62.45028                         | 128.93318 | +16.536           | -0.7664                   | 144.70276 |



To get values of G

$$\begin{aligned}
 A &= +4467'' \sin (g - 2g') + 2(w - w') \\
 &= +1.24083 \sin A = 1.24083 \times \sin 162^\circ.00886 = +0.383255 \\
 B &= +2145'' \sin(2g - 2g') + 2(w - w') \\
 &= +0.59583 \sin B = 0.59583 \times \sin 86^\circ.40846 = +0.5946597 \\
 C &= +658'' \sin (-g) = +658'' \sin (180 + g') \\
 &= +0.18277 \sin C = 0.18277 \times \sin 289^\circ.86948 = -0.178895 \\
 D &= +198'' \sin(g - 3g') + 2(w - w') \\
 &= +0.55 \sin D = 0.55 \times \sin 104.4175 = +0.532678
 \end{aligned}$$

$$\begin{aligned}
 E &= +155'' \sin (2g - 3g') + 2(w - w') \\
 &= +0.043055 \sin D = 0.043055 \times \sin 29^\circ.9152 = +0.0217986
 \end{aligned}$$

Algebraic total from A to E = 1.3601763

which is the value of G

In Latitude

$$\begin{aligned}
 F &= 522''.629 \sin (g - 2g') + (w - 2w') \\
 &= +0.1453 \sin F = 0.1453 \times \sin 144^\circ.70276 = +0.083957
 \end{aligned}$$

where (1) g is the mean anomaly of the Moon

g' is the mean anomaly of the Sun

w is the distance of the Moon's perigee from the Moon's ascending node,

w' is the distance of the Sun's perigee from the Moon's ascending node.

(2) for 1800 January 0.5 day

$$\begin{aligned}
 g' &= 0^\circ.40885 + (99.) 359^\circ.0551667 T \\
 &\quad - 0^\circ.001644722 T^2
 \end{aligned}$$

$$\begin{aligned}
 w' &= 246^\circ.23102777 + (5.) 135^\circ.8602055 T \\
 &\quad - 0^\circ.001644722 T^2 - 0^\circ.000001840277 T^3
 \end{aligned}$$

*Neither noble birth nor good turn nor learning nor gift  
nor even marriage ties capture the heart of such women,  
fickle of heart as they are*

*Ayodhya Kanda - Canto 39 - Verse 23*

## EQUATION OF CENTRE

C.G. Rajan in his book of planetary positions has given the value of 'equation of centre' for a given Moon anomaly in three parts, viz.,  $J_1$ ,  $J_2$  and  $J_3$ . Each of these parts corresponds respectively to each of the three terms of the equation of centre involving  $\sin M$ ,  $\sin 2M$  and  $\sin 3M$  where  $M$  is the mean anomaly.

1. Mean anomaly of Moon at Noon GMT on 11.2.4433 B.C.  $276^\circ.72828$
2. Correction for perturbation, 'G'  $-1^\circ.3607176$
3. Adding (1) & (2)  $275^\circ.36756$

Calculation of the value of equation of centre, ie. 'f' for  $275^\circ.36756$ :

|            | $J_1$  | $J_2$   | $J_3$  |
|------------|--------|---------|--------|
| o          | o      | o       | o      |
| 275        | -6.266 | -0.0375 | 0.0100 |
| 276        | -6.256 | -0.0449 | 0.0098 |
| Difference | 0.01   | 0.0074  | 0.0002 |
| 275.36756  | -6.262 | -0.0402 | 0.0099 |

Algebraically adding  $J_1$ ,  $J_2$  and  $J_3$  we get 'f' as  $-6^\circ.2923$

Reduction factor to the ecliptic 'R':

This factor is required to arrive at the true longitude of Moon. This is prepared from the value 'N' vide item 7 in part IV Calculating it from the values given in Table II of C.G. Rajan's book we get 'R' for the value of 'N'  $293^\circ.06681$  as  $0^\circ.0833$ .

*In a rulerless land self-controlled ascetics, moving all by themselves and contemplating on the self with their own mind and taking up their abode wherever the evening falls, do not move about so for want of hospitable householders.*

- Ayodhya Kanda - Canto 67 : Verse 23

## MOON

Corrections due to Secular Variations:

| Movement per year |  | 129°.3848065        | 88°.722317        | 19°.321816   |
|-------------------|--|---------------------|-------------------|--------------|
| Sl. No.           | Description  | Mean Longitude<br>L | Mean Anomaly<br>M | 360 - Z<br>V |
| 1.                | Position at Noon GMT or 17 hrs. 23 min. 5 secs. LMT on 1st Jan. 4400 B.C. (Table 1)  | 124.6226            | 177.9782          | 290.5689     |
| 2.                | Movement in 33.1342465 yearstill Noon GMT or 17 hrs. 23 mins. 5 secs., on 11.2.4433 B.C.   | 327.06778           | 59.74708          | 280.42355    |
| 3.                | Adding (1) & (2)   | 91.69038            | 237.72528         | 210.99245    |
| 4.                | Correction for secular variation Part 1 - (Table 2)  | -10.008             | 46.973            | -7.97        |
| 5.                | Correction for secular variation Part 2 - (Table 3)  | -0.4652             | -7.97             | 0.7439       |
| 6.                | Algebraically adding (3) (4) & (5) to get the Mean Longitude of Moon at Noon GMT or 17 hrs. 23 min. 5 secs. LMT on the 11th Feb. 4433 B.C. | 81.21718            | 276.72828         | 203.76635    |

## MOON

**To find the mean longitude of Moon at 17 hrs. 23 min & 5 secs. LMT  
at Ayodhya, India on the 11th February, 4433 B.C.**

|  |   |             |
|--|---|-------------|
|  | o |             |
| 1. Longitude of Moon at 12 Noon, GMT<br>on the 11th February, 4433 B.C.  | L | 81.21718    |
| 2. Factor for important perturbances caused<br>by the attraction of the Sun and the<br>planets on the Moon                                       | G | - 1.3607176 |
| 3. Adding (1) & (2)  | H | 79.856462   |
| 4. Value of the equation of centre for<br>Moon's anomaly   | f | - 6.2923    |
| 5. Adding (3) & (4)  | K | 73.564162   |
| 6. Reduction factor to the ecliptic  | R | 0.0833      |
| 7. Adding (5) & (6) to get the longitude of<br>Moon at 12 Noon GMT., ie. 17 hrs. 23<br>min & 5 secs., at Ayodhya, the birth<br>place of Sri Rama |   | 73.647462   |
| 8. Less motion of Moon in 6.58 hours at<br>0°.549 per hour for the birth time of<br>Sri Rama at 10 hr. 47 min. 48 secs.<br>which is 3°.612       |   | 70.035462   |
| 9. Adding Ayanamsa of 19°.965  |   | 90.000462   |
| 10. Longitude of Moon at the time of birth<br>of Sri Rama as per Valmiki   |   | 90.000278   |

**NOTE:** The result arrived at, by a most modern method of calculation adopted all over the present world, is correct almost to the second to what Valmiki has given.

## MOON

## Part IV:

To find out the latitude of Moon:

|   |               |
|---|---------------|
|   | 0             |
| 1. Mean longitude of Moon at Noon GMT on 11.2.4433 B.C.   | 81.217181     |
| 2. Correction due to important disturbances 'G'   | - 1.3607176   |
| 3. Adding (1) & (2)   | 79.856463     |
| 4. Correction due to equation of centre 'f'   | - 6.2923      |
| 5. Adding (3) & (4), We get 'K' as  | 73.564163     |
| 6. Value of $(360 - Z)$ i.e., 'V'   | 203.76635     |
| 7. Adding (5) & (6), we get 'N' as  | 277.33051     |
| 8. Extracting and calculating 's' from Table 10 of C.G.Rajan's book on Planetary Positions for Moon we get 'S' as | - 5.1018833   |
| Rough work:   |               |
| for 'N' of $277^\circ$ 'S'  | = - 5.1055556 |
| for 'N' of $278^\circ$ 'S'  | = - 5.0944444 |
| for 'N' of $277.33051^\circ$ 'S'  | = - 5.1018833 |
| 9. Correction due to perturbances   | 0.0833        |
| 10. Adding (8) &, we get  | - 5.0185833   |
|   | or - 5 1' 7"  |

So the latitude of Moon at the Birth Time of Sri Rama is  $5^\circ 1' 7''$  (South)

*The autumnal streams gradually reveal their banks in the same way as brides bashful in their first meeting with their spouse uncover their body by degrees.*

*Kishkinda - Bala Kanda 4  
- Canto 30 - Verse 58*

## RAHU AND KETU

To find the longitudes of Rahu and Ketu at 17 hours, 23 min. 5 secs. LMT at Ayodhya on the 11th February, 4433 B.C., first and to find the Longitude for the birth time of Sri Rama at 10th 46m. 48sec. at Ayodhya on the 11th February, 4433 B.C.

Rahu and Ketu are Indian planets in the sense that these planets do not find a similar status in the western systems.

Further, just as Varamihira has omitted reference to Rahu and Ketu Valmiki also has omitted reference to them. However Valmiki has referred to the movements and effects of Rahu and Ketu in his text. So we have to find out the longitudes of Rahu and Ketu.

European Almanacs and Ephemeris give usually only the Mean Longitude of the Ascending Node (Rahu) without giving the True Longitude. To get the true longitude, two corrections are necessary.

They are, (1) due to the Nutation in Longitude and  
(2) due to the several inequalities to which the node is subject.

But the greatest of the several quantities which make up the correction of Nutation is  $17''.234$ , and the correction for the greatest of the inequalities ranges from  $1^{\circ} 30' 26''$  to  $-1^{\circ} 30' 26''$ . However the author has taken both the inequalities into consideration and has calculated the following.

The magnitude of the correction due to the Nutation has been taken from Table 8 of C.G.Rajan's book in his planetary tables. This works out to be 53 seconds i.e.,  $-0^{\circ}.0147336$ .

The magnitude of correction 'C' due to the greatest inequality of Node is  $5426'' \sin 2(S-Z)$  where S stands for the true longitude of Sun and Z stands for the mean longitude of the Ascending Node.

*In a rulerless land even the Brahmans richly endowed  
with wealth do not pay handsome sacrificial fees to the  
priests officiating even at big sacrificial performances.*

*-Ayodhya Kanda - Canto 67, Verse 14.*

Now let us calculate the longitudes of Rahu and Ketu.

- |  |            |
|--|------------|
| 1. 'V' for 4400 B.C., 0.5 day (Table V.1.)                         | 290°.5689  |
| 2. For 0.331342465 of a century at 134°.1222062                    | 44 .446998 |
| <hr/>  |            |
| per century  |            |
| 3. Subtracting   | 246°.1219  |
| 4. Secular correction, part 1                                      | -7°.97     |
| 5. Secular correction, part 2                                      | 0°.7439    |
| 6. Algebraically adding (3), (4) & (5), we get<br>'V' as 238°.8958 |            |

7.  $Z = 360^\circ - 238^\circ.8958 = 121^\circ.1042$   
 8. Correction for Nutation 'U' =  $-0^\circ.0041666$   
 9. Correction for the inequality of the Node:

$$P = 2(9^\circ - 121^\circ.1042) = 224^\circ.2084$$

Now taking  $C = 5426'' \sin P$  where P  
stands for  $2(S - Z)$

$$P = 2(9^\circ - 121^\circ.1042) = 224^\circ.2084$$

Now taking  $C = 5426'' \sin P$ , we have  
 $5426'' \times \sin 224^\circ.2084$

$$= 5426'' \times 0^\circ.6972702 = -1^\circ.059411$$

$$'U' = -0^\circ.0147336$$

$$'C' - 'U' = +1^\circ.04467745$$

$$Z = 121^\circ.1402$$

$$'C' - 'U' - Z = 120 .05952$$

$$\text{So Longitude of Rahu} = 120 .05952$$

Add motion of Rahu in 6.58

hrs at  $0^\circ.529916$  per 24 hours

for the Birth Time of Sri

Rama at 10h. 47m. 48secs.

A.M. LMT.

$$0^\circ.0145285$$

Longitude of Rahu

$$120 .07405 \text{ or } 120^\circ 4' 26''$$

Adding  $180^\circ$ , we get the

longitude of Ketu as

$$300 .07405 \text{ or } 300^\circ 4' 26''$$

To find the longitude and latitude of Kuja at 17h. 23m. 5secs. LMT at Ayodhya, India i.e. at Noon Greenwich on the 11th February, 4433 B.C.

### SECTION I.

(a) The columns denoted by L, G and U in the following tables give the values of the Mean Longitude, Mean Anomaly and the Mean argument of latitude of Kuja for centuries. These are prepared from the following formulae.

(b) Let L be the mean longitude of Kuja in its undisturbed orbit.

Let g be the mean anomaly.

Let U be the argument of latitude.

Let T be the time reckoned in Julian centuries of 36525 days,

from the epoch, 3200 B.C., January, 0.5 day i.e., Noon Greenwich.

$$\begin{aligned} 1. L &= 33^\circ 22' 12''.62 + 68910117.19T + 1''.1184T^2 \\ 2. g &= 152^\circ 59' 49''.49 + 68903493.19T - 0''.651T^2 + 0''.004T^3 \\ 3. U &= 23^\circ 55' 23''.22 + 68907340''.74T + 1''.1234T^2 + 0''.0192T^3 \end{aligned}$$

(c) Now in the motion of L, putting  $l = 68910117''.62$  we have  
for one century of 25 leap years,  $l = (53.) 61^\circ 41' 57''.62$   
for one ordinary year of 365 days,  $l = 191^\circ 17' 09''.51215082$   
for one hour of 365 days a year  $l = 0^\circ 1' 18''.61067$

(d) In the motion of putting  $a = 68903493''.19T$ , we have  
for one century of 25 leap years,  $a = (53.) 59^\circ 51' 33''.19$   
for one ordinary year of 365 days,  $a = 191^\circ 16' 3''.31319084$

(e) In the motion of U, putting  $b = 68907340''.74T$ , we have  
for one century of 25 leap years,  $b = (53.) 60^\circ 55' 40''.74$   
for one ordinary year of 365 days,  $b = 191^\circ 16' 41''.762364134$

$$g = 333^\circ 60' 75'' \text{ on } 1900 \text{ AD } .318.387964$$

$$U = 157^\circ 45' 59'' \text{ on } 1900 \text{ AD}$$

*Serpents of many colours carrying terrible poison in their fangs which remained shut up for a long time in holes for fear of rains ever since the time clouds newly made their appearance in the sky and which were all but dead, their means of sustenance having been completely cut off, are now emerging freely from their holes tormented as they are with hunger.*

- Kishkinda Kanda - Canto 30 - Verse 44

$$L = 292^\circ 41' 61.47$$

$$U = 242^\circ 9' 18.470$$



TABLE I.  
KUJA

| Abbreviation       | L          | g          | U          |
|--------------------|------------|------------|------------|
| Motion per century | 61°.699339 | 59°.859219 | 60° 927983 |
| B.C. Years         | o          | o          | o          |
| 3200               | 33.370172  | 152.99708  | 23.923117  |
| 3300               | 331.67085  | 93.137861  | 322.99513  |
| 3400               | 269.97149  | 33.278642  | 262.06715  |
| 3500               | 208.27216  | 333.41942  | 201.13197  |
| 3600               | 146.57282  | 273.5602   | 140.21119  |
| 3700               | 84.873478  | 213.70099  | 79.283202  |
| 3800               | 23.174139  | 153.84177  | 18.355219  |
| 3900               | 321.4748   | 93.982547  | 317.42724  |
| 4000               | 239.77546  | 34.123328  | 256.49925  |
| 4100               | 198.07612  | 334.26411  | 195.57127  |
| 4200               | 136.37678  | 274.40489  | 134.64329  |
| 4300               | 74.67744   | 214.54567  | 73.15304   |
| 4400               | 12.978056  | 154.68645  | 12.787321  |
| 4500               | 311.27877  | 94.827233  | 311.85934  |
| 4600               | 249.57943  | 34.968014  | 250.93136  |
| 4700               | 187.88009  | 335.1088   | 190.00337  |
| 4800               | 126.19075  | 275.24958  | 129.07539  |
| 4900               | 64.48411   | 215.39036  | 68.147406  |
| 5000               | 2.782072   | 155.53114  | 7.219423   |

*Adorned with water-lilies, the water in the big pond with  
a solitary swan lying asleep on it looks delightful like  
the sky completely bereft of clouds, nay, illumined by  
the full moon and spangled with a hose of stars at night.*

*Kishkinda Kanda - Canto 30 - Verse 47*

## KUJA.

TABLE 2.

## Secular Variation - Part 1.

| B.C. Years | L      | g       | U      |
|------------|--------|---------|--------|
|            | o      | o       | o      |
| 3200       | 0.8078 | 4.7028  | 0.8114 |
| 3300       | 0.8389 | 4.8889  | 0.8431 |
| 3400       | 0.8560 | 5.0850  | 1.1671 |
| 3500       | 0.8861 | 5.2823  | 1.2003 |
| 3600       | 0.9122 | 5.4846  | 1.2342 |
| 3700       | 0.9382 | 5.6929  | 1.2688 |
| 3800       | 0.9643 | 5.9072  | 1.3041 |
| 3900       | 0.9904 | 6.1265  | 1.3402 |
| 4000       | 1.0165 | 6.3408  | 1.3770 |
| 4100       | 1.0426 | 6.5701  | 1.4144 |
| 4200       | 1.0687 | 6.8154  | 1.4524 |
| 4300       | 1.0948 | 7.0357  | 1.4910 |
| 4400       | 1.1209 | 7.28357 | 1.5303 |
| 4500       | 1.1470 | 7.5513  | 1.5702 |
| 4600       | 1.1731 | 7.8316  | 1.6108 |
| 4700       | 1.1731 | 7.8136  | 1.6108 |
| 4800       | 1.2252 | 8.3442  | 1.6939 |
| 4900       | 1.2514 | 8.6185  | 1.7369 |
| 5000       | 1.2772 | 8.8988  | 1.7809 |

*A King who is licentious and evil minded, is of evil conduct and is counselled by sinful men, surely ruins himself, his own kith and kin and well as his state.*

*Aranya.Kanda - Canto 37 - Verse 2*

## KUJA

TABLE 3.

Secular Variation - Part 2.

| B.C. Years | g<br>o | U<br>o |
|------------|--------|--------|
| 3200       | 0.1474 | 0.7075 |
| 3300       | 0.1562 | 0.7496 |
| 3400       | 0.1653 | 0.7931 |
| 3500       | 0.1748 | 0.8379 |
| 3600       | 0.1846 | 0.8841 |
| 3700       | 0.1947 | 0.9316 |
| 3800       | 0.2502 | 0.9805 |
| 3900       | 0.2160 | 1.0309 |
| 4000       | 0.2271 | 1.0827 |
| 4100       | 0.2386 | 1.1359 |
| 4200       | 0.2504 | 1.1906 |
| 4300       | 0.2626 | 1.2467 |
| 4400       | 0.2751 | 1.3043 |
| 4500       | 0.2880 | 1.3636 |
| 4600       | 0.3012 | 1.4256 |
| 4700       | 0.3148 | 1.4877 |
| 4800       | 0.3289 | 1.5513 |
| 4900       | 0.3434 | 1.6165 |
| 5000       | 0.3582 | 1.6832 |

*No state can be ruled by a king who is severe, nor by him who is most adversely disposed to the people nor by him who is boorish in his manners.*

*Aranya Kanda - Canto 42 - Verse 11*

## KUJA.

Table 4.

Rossis Correction to Newcomb's formula.

| B.C. Years | L<br>o    | g<br>o  | U<br>o  |
|------------|-----------|---------|---------|
| 3200       | 0.18509   | 0.2180  | 0.1660  |
| 3300       | 0.2419875 | 0.2225  | 0.1673  |
| 3400       | 0.298885  | 0.2270  | 0.1686  |
| 3500       | 0.3557825 | 0.2315  | 0.1698  |
| 3600       | 0.41268   | 0.2360  | 0.1711  |
| 3700       | 0.4695775 | 0.2404  | 0.1724  |
| 3800       | 0.526475  | 0.2449  | 0.1737  |
| 3900       | 0.5833725 | 0.2493  | 0.1750  |
| 4000       | 0.64027   | 0.2538  | 0.1762  |
| 4100       | 0.6971675 | 0.2583  | 0.1775  |
| 4200       | 0.754065  | 0.2627  | 0.1788  |
| 4300       | 0.8109625 | 0.2672  | 0.1800  |
| 4400       | 0.86786   | 0.27169 | 0.18131 |
| 4500       | 0.9247575 | 0.2762  | 0.1820  |
| 4600       | 0.981655  | 0.2806  | 0.1839  |
| 4700       | 1.0385525 | 0.2851  | 0.1851  |
| 4800       | 1.09545   | 0.2896  | 0.1864  |
| 4900       | 1.1523475 | 0.2940  | 0.1877  |
| 5000       | 1.209245  | 0.2988  | 0.1891  |

*People speaking agreeable words are always easy to find. He, who speaks words which though unpalatable, are yet wholesome, is difficult to find.*

*- Aranya Kanda - Canto 37 - Verse 2*

## KUJA

## (c) Calculation of Reduction to the ecliptic of Kuja 'M'

1. Argument of latitude of Kuja, U on 11.2.4433 B.C. =  $231^{\circ}.05488$
2. Adding equation of centre, f,  $4^{\circ}.0037$ , we get  $235^{\circ}.05858$
3. Extract from Table II of Mars from C.G.Rajan's Tables for the reduction to the ecliptic, M for  $253^{\circ}.0585$ . Subtracting  $180^{\circ}.00$  we get  $55^{\circ}.0585$ .

| U  | (0)U<br>M<br>" | ( $\frac{1}{2}$ )U<br>M<br>" | (1)U<br>M<br>" | U   |
|----|----------------|------------------------------|----------------|-----|
| 55 | 55             | 55                           | 55             | 235 |
| 56 | 54             | 54                           | 54             | 236 |

Therefore, for  $235^{\circ}.0585$  by rule of three, we get M as  $-0^{\circ}.0152$ . Since U is between  $180^{\circ}$  and  $270^{\circ}$ , M is negative.

Secular Variation of Reduction to the ecliptic has not been taken into consideration, because it is a very negligible quantity.

## (d) Calculation of Heliocentric latitude of Kuja

We have seen above that U is  $235^{\circ}.0585$  after correction.

Since it is greater than  $180^{\circ}$ , we have to subtract  $180^{\circ}$  and we get  $55^{\circ}.05968$ .

Extract from Table 12 for Mars from C.G.Rajan's Tables, b:

| U  | (0)U                 | ( $\frac{1}{2}$ )U   | (1)U                 | U |
|----|----------------------|----------------------|----------------------|---|
| 55 | $1^{\circ} 30' 56''$ | $1^{\circ} 31' 29''$ | $1^{\circ} 32' 02''$ |   |
| 56 | $1^{\circ} 32' 2''$  | $1^{\circ} 32' 34''$ | $1^{\circ} 33' 06''$ |   |

For  $55^{\circ}.05968$  by rule of three method,  $b_1 = 1^{\circ} 30' 9''.6$

Since U is greater than  $180$  deg.,  $b_1$  is negative.

(e) Calculation of Secular Variation of the latitude in seconds,  $b_2$ :

Extract from Table 13 of C.G.Rajan's Tables for secular variation of Kuja's latitude in seconds,  $b_2$

|    |       |
|----|-------|
| U  | $b_2$ |
| o  | o     |
| 55 | 2     |
| 56 | 2     |

For  $55^\circ.05968$ ,  $55''$  or  $0^\circ.0152777$ .

Since U is greater than 180 degrees,  $b_2$  is negative.

$$b = b_1 + b_2 = -1^\circ.5026 - -0^\circ.015277 = -1^\circ.5179$$

### SECTION III.

(a) Calculation of Equation of Centre of Kuja 'f':

Equation of Centre of Kuja 'f'

| g  | (0)g | ( $\frac{1}{4}$ )g | ( $\frac{1}{2}$ )g | ( $\frac{3}{4}$ )g | (1)g    |
|----|------|--------------------|--------------------|--------------------|---------|
| o  | ' o  | ' " o              | ' "                | o ' "              | o ' "   |
| 19 | 3 54 | 25 3               | 57 22 4            | 0 17               | 4 3 13  |
| 20 | 4 6  | 8 4                | 9 3 4              | 11 50              | 4 14 44 |
|    |      |                    |                    |                    | 4 17 37 |

Therefore, for  $19^\circ.47408$ ,  $f_1 = -3^\circ.9995404$ .

Extract from Table 10 of C.G.Rajan's Tables for secular variation of the Equation of Centre of Mars,  $f_2$ :

g for  $19^\circ$  is  $15''$  and for  $20^\circ$ ,  $16''$  and therefore  $f_2$  for  $19.47408$  is  $15''$ .

$$f = f_1 + f_2 = 3^\circ.9995404 + 0^\circ.00416 = 4^\circ.0037$$

(b) Radius Vector of Kuja:

From Table 15 for Radius Vector of Mars, r, we get it as 1.13914 since g is near  $19.5^\circ$  deg.

## KUJA.

## SECTION IV.

| Abbreviation<br>Explanation                                       | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Mean<br>Argument of<br>latitude. |
|---|------------------------|----------------------|---------------------------------------|
| Motion per century  | 61°.699343             | 59°.859217           | 60°.927983                            |
| " " year  | 191°.28597             | 191°.26759           | 191°.27827                            |
| Sl. Description<br>No.  | o                      | o                    | o                                     |
| 1. Mean longitude on<br>3200 B.C., 0.5 day                        | 33.370172              | 152.99708            | 23.923117                             |
| 2. Movement in 12 cen-<br>turies, i.e., from<br>3200 to 4400 B.C. | 20.392116              | 358.31063            | 11.135796                             |
| 3. Subtracting (2)<br>from (1)                                    | 12.978056              | 154.68645            | 12.787321                             |
| 4. Movement in<br>33.:342465 years                                | 218.11648              | 217.50747            | 217.86135                             |
| 5. Adding (3) & (4)   | 231.09454              | 12.19392             | 230.64867                             |
| 6. Secular Variation<br>Part 1.                                   | -1.1209                | 7.28357              | 1.5303                                |
| 7. Secular Variation<br>Part 2.                                   | —                      | -0.2751              | 1.3043                                |
| 8. Rossis correction to<br>Newcomb's formula<br>Table 4           | 0.86786                | 0.27169              | 0.18131                               |
| 9. Equation of Centre   | 4.0037                 | —                    | —                                     |
| 10. Reduction to the<br>ecliptic                                  | -0.0152                | —                    | —                                     |
| 11. Adding (6) up to<br>(10) algebraically L                      | 234.83                 | 19.47408             | 231.05598                             |

## KUJA

## SECTION V:

Conversion of Heliocentric longitude into Geocentric Longitude

- |     |    |                                    |       |          |
|-----|----|------------------------------------|-------|----------|
| (a) | 1. | Longitude of the Sun 'S'           | .. .. | 9° 00    |
|     | 2. | Radius vector of the Sun, 'R'      | .. .. | 0 .98347 |
|     | 3. | Heliocentric Longitude of Kuja 'H' | ..    | 234 .83  |
|     | 4. | Radius Vector of Kuja 'r'          | ..    | 1 .3914  |

(b) To find the geocentric longitude of Kuja, the formula is

$$\begin{aligned}
 \tan P &= \frac{r \cdot \cos b \cdot \sin (H-S)}{R + [r \cdot \cos b \cdot \cos (H-S)]} = \frac{V}{W} \\
 &= \frac{1.3914 \times \cos 1^\circ.51 \times \sin (234^\circ.83 - 9^\circ.0)}{0.98347 + [1.3914 \times \cos 1^\circ.51 \times \cos (234^\circ.83 - 9^\circ.0)]} \\
 &= \frac{1.3914 \times 0.9996426 \times -0.7172755}{0.98347 + (1.3914 \times 0.9996426 \times -0.6967896)} \\
 &= \frac{-0.9976669}{0.0142791} = -69.781031. \quad P = 89^\circ.178977
 \end{aligned}$$

Since V is negative and w is negative, adding 180° we get 269° .17898

Since x = P+S, adding S i.e., 9° .0, we get 278° .17898

Adding Ayanamsa for 11th Feb. 4433 B.C. i.e., 19° .965 298° .14398

Less for the movement of Kuja in 6.58 hours,

at 0° .0218361 per hour for the birth time of

Sri Rama at 10h. 47m. 48s., A.M., LMT,

i.e., 0° .14368, we get 298° .00004

Longitude of Kuja at the time of Sri Rama's birth

as given by Valmiki 298° .00

Note: The difference between our calculation and the longitude given by Valmiki, is very negligible and so rounded as 298° .00



## SECTION VI.

Conversion of heliocentric latitude into geocentric latitude:

In Section IV (d) we got the value of heliocentric latitude as  $1^{\circ}.5179$  (S)

Since  $P = 269^{\circ}.72338$  and is near  $270^{\circ}$  i.e., between  $225^{\circ}$  and  $315^{\circ}$ , the formula applicable is

$$\tan y = \frac{r. \sin b. \sin P}{r. \cos b. \sin (H - S)} = \frac{C}{V}$$

Substituting values,

$$\begin{aligned} &= \frac{1.3914 \times \sin 1^{\circ}.5179 \times \sin 269^{\circ}.17898}{1.3914 \times \cos 1^{\circ}.5179 \times \sin (234^{\circ}.28 - 9^{\circ}.0)} \\ &= \frac{1.3914 \times 0.0264892 \times -0.9998973}{1.3914 \times 0.9996491 \times -0.6967896} \\ &= \frac{-0.0368532}{-0.9691722} \\ &= 0.0380254 \\ y &= 2^{\circ}.1776479 \text{ or } 2^{\circ} 10' 39''.5 \end{aligned}$$

Since both C and V are negative, the latitude is Northern.

So the Geocentric Latitude of SRI RAMA at the time of his BIRTH at 10h. 47m. 48s. A.M., LMT., at Ayodhya, India on the 11th February, 4433 B.C. is  $2^{\circ} 10' 39''.5$

*No man is the friend of any one, nor is anything to be gained by any one through any one; for alone is a creative born and alone does it perish.*

*-Jebali to Rama - Valmiki Ramayana  
- Ayodhya Kanda - Canto 108 - Verse 3*

## BUDHA.

To find the heliocentric longitude and latitude of Budha at 17h. 23m. 5s. LMT. at Ayodhya, India on the 11th February, 443 B.C., i.e., Noon GMT.

The columns denoted by L, g, and U in the following Table I give the values of the Mean Longitude, Mean Anomaly and Mean Argument of latitude of Budha for centuries. They are prepared from the following formulae.

Let L be the mean longitude of Budha in its undisturbed orbit.

Let g be the mean anomaly.

Let U be the argument of latitude.

Let T be the time reckoned in Julian centuries of 36525 days from the epoch 3200 B.C. January, 0.5 day i.e. noon, Greenwich.

$$\begin{aligned} (1) L &= 49^\circ.677936 + 538106654''.8T + 1''.084T^2 \\ (2) g &= 53^\circ.107661 + 538101055''.04T + 0''.024T^2 \\ (3) U &= 62^\circ.977228 + 538102388''.05T + 0''.458T^2 \end{aligned}$$

Now in the motion of L, putting  $l = 538106654''.8T$ , we have

for one century of 25 leap years,  $l = (415, ) 74^\circ 4' 14''.80$

for one ordinary year of 365 days,  $l = (4, ) 53^\circ 43' 3''.408678987$

In the motion of g, putting  $a = 538101055''.04T$ , we have

for one century of 365 leap years,  $a = (415, ) 72^\circ 30' 55''.04$

for one ordinary year of 365 days,  $a = (4, ) 53^\circ 42' 7''.449407255$

In the motion of U, putting  $b = 538102388''.05T$ , we have

for one century of 25 leap years,  $b = (415, ) 72^\circ 63' 8''.05$

for one ordinary year of 365 days,  $b = (4, ) 53^\circ 42'$

$20''.770383299$

(r stands for one complete revolution of  $360^\circ$ ).

$$g \text{ at } 1900 \text{ AD} = 98^\circ 18' 45'' \quad 169 \text{ b } 10$$

*Ministers who counsel violent measures surely reap suffering along with the counselled even as chariots driven by a dull-witted charioteer coursing swiftly on uneven roads perish with the chariots.*

- Aranya Kanda - Canto 42 - Verse 12

$$L \text{ at } 1900 \text{ AD} = 174^\circ 02' 67'' 869903 \quad 173^\circ 30'$$

$$U \text{ at } 1900 \text{ AD} = 136^\circ 60' 863''$$

## BUDHA.

TABLE 1.

|                         | L<br>o    | g<br>o    | U<br>o    |
|-------------------------|-----------|-----------|-----------|
| Movement per<br>century | 74.070778 | 72.515287 | 72.885569 |
| B.C. Years              |           |           |           |
| 3200                    | 49.677936 | 53.107661 | 62.977228 |
| 3300                    | 335.60716 | 340.59237 | 350.09166 |
| 3400                    | 261.53638 | 268.07708 | 277.20609 |
| 3500                    | 187.4656  | 195.56179 | 204.32052 |
| 3600                    | 113.39482 | 123.04651 | 131.43495 |
| 3700                    | 39.32404  | 50.53121  | 58.54938  |
| 3800                    | 325.25327 | 338.01593 | 345.66381 |
| 3900                    | 251.18249 | 265.50064 | 272.77824 |
| 4000                    | 177.11171 | 192.98535 | 199.89267 |
| 4100                    | 103.04094 | 120.47006 | 127.0071  |
| 4200                    | 28.97016  | 47.95477  | 54.12153  |
| 4300                    | 314.89938 | 335.43948 | 341.23596 |
| 4400                    | 240.8286  | 262.92419 | 268.35039 |
| 4500                    | 166.75782 | 190.40891 | 195.46483 |
| 4600                    | 92.68704  | 117.89362 | 122.57926 |
| 4700                    | 18.61629  | 45.37853  | 49.69369  |
| 4800                    | 304.54549 | 332.86304 | 336.80812 |
| 4900                    | 230.47471 | 260.34775 | 263.92255 |
| 5000                    | 156.40394 | 187.83246 | 191.03698 |

*Everyone injures him who adopts a severe course of  
action running counter to the interests of the people as  
one strikes a wicked serpent arrived near.*

*- Aranya Kanda - Canto 29 - Verse 4*

## BUDHA.

TABLE 2.

## Secular Variation.

| B.C. Years | L<br>o    | g<br>o | U<br>o |
|------------|-----------|--------|--------|
| 3200       | 0.7830555 | 0.0173 | 0.3308 |
| 3300       | 0.968258  | 0.0179 | 0.3436 |
| 3400       | 1.1547963 | 0.0185 | 0.3564 |
| 3500       | 1.3406666 | 0.0191 | 0.3692 |
| 3600       | 1.526537  | 0.0197 | 0.3822 |
| 3700       | 1.7124074 | 0.0203 | 0.3952 |
| 3800       | 1.8982778 | 0.0209 | 0.4084 |
| 3900       | 2.0841481 | 0.0215 | 0.4218 |
| 4000       | 2.2700185 | 0.0221 | 0.4352 |
| 4100       | 2.4559    | 0.0227 | 0.4486 |
| 4200       | 2.6418    | 0.0233 | 0.462  |
| 4300       | 2.8276    | 0.0239 | 0.4756 |
| 4400       | 3.0135    | 0.0245 | 0.4894 |
| 4500       | 3.1994    | 0.0251 | 0.5032 |
| 4600       | 3.3852    | 0.0257 | 0.5172 |
| 4700       | 3.5711    | 0.0263 | 0.5312 |
| 4800       | 3.757     | 0.0269 | 0.5412 |
| 4900       | 3.9429    | 0.0275 | 0.5594 |
| 5000       | 4.1287    | 0.0281 | 0.5738 |

---

*People turn away in fear from a man telling lies in the same way as they do from a serpent. Virtue has its culmination in truthfulness; nay, it is declared to be the root of all*

*- Ayodhya Kanda - Canto 109 - Verse 12*

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BUDHA

SECTION III.

Calculation of Equation of centre 'f':

1. From Table 7 of C.G. Rajan's Tables of Budha for 'g'  $283^{\circ}.57118$   
(Section IV)

|       |   |                                     |
|-------|---|-------------------------------------|
| $f_1$ | = | $-23^{\circ}.6725$                  |
| $f_2$ | = | $-0^{\circ}.0025$                   |
| $f$   | = | <u><math>-23^{\circ}.675</math></u> |

2. Calculation of the Radius Vector, 'r':

From Table 13 of C.G. Rajan's Tables of Budha for  $g = 283^{\circ}.57118$   
(Section IV)

we get 'r' as 0.38472

3. Calculation of Reduction to the ecliptic in seconds of arc 'M'

Argument of latitude of Budha, (Section IV)  $289^{\circ}.33959$

Subtracting equation of centre 'f',  $-23^{\circ}.675$ , we get U as  $265^{\circ}.66459$

From Table 9 of C.G. Rajan's Tables of Mercury, we get M for  $265^{\circ}.66459$  as  $-0.0325$

Since U is between 180 and 270 degrees, 'M' is negative.

4. Calculation of heliocentric latitude of Budha:

Since U is greater than  $180^{\circ}$ , subtracting  $180^{\circ}$  from  $265.66459$   
we get  $85^{\circ}.66459$

From Table 10 of C.G. Rajan's Tables of Mercury, we extract

for  $85^{\circ}.0 \dots 6^{\circ}.976111$

for  $86^{\circ}.0 \dots 6^{\circ}.985833$

Difference  $0^{\circ}.0097222$

for  $85.66459$ ,  $b_1 = 6^{\circ}.9825724$

From Table 11 of C.G. Rajan's Tables of mercury, we get  $b_2$  for  
as  $0^{\circ}.0019444$

$$b = b_1 + b_2 = 6^{\circ}.9825724 + 0^{\circ}.0019444 = -6^{\circ}.9845168$$

So the heliocentric latitude of Budha is  $-6^{\circ}.9845168$ .

## BUDHA

## SECTION IV.

| Abbreviation  | L                 | g               | U                             |
|---|-------------------|-----------------|-------------------------------|
| Explanation   | Mean<br>Longitude | Mean<br>Anomaly | Mean Argument<br>of latitude. |
|   | o                 | o               | o                             |
| 1. Movement per year  | 53.717613         | 53.702067       | 53.705769                     |
| 2. Movement per<br>century  | 74.070778         | 72.515289       | 72.885569                     |
| 3. Position on 3200<br>B.C. 0.5 day<br>(Table 1)                      | 49.677936         | 53.107661       | 62.977228                     |
| 4. Movement in 12<br>centuries i.e.,<br>from 3200 to<br>4400 B.C.     | 168.84934         | 150.18347       | 154.62683                     |
| 5. Subtracting (4)<br>from (3)  | 240.8286          | 262.92419       | 268.35039                     |
| 6. Movement in<br>33.1342465 years<br>at 53.717613 per<br>year        | 339.8926          | - 339.37751     | - 339.5002                    |
| 7. Adding<br>algebraically<br>(5) & (6)                               | 220.7212          | 283.54668       | 288.85019                     |
| 8. Secular variation<br>correction (Table 2)                          | 3.0135            | 0.0245          | 0.4894                        |
| 9. Equation of centre<br>'f'  | - 23.675          | -               | - 23.675                      |
| 10. Reduction to the<br>ecliptic of Budha<br>in seconds of arc<br>'M' | - 0.0325          |                 |                               |
| 11. Adding algebraically<br>(7) (8) and (9)                           | 200.0272          | 283.57118       | 265.66459                     |

## SECTION V:

Conversion of heliocentric longitude into geocentric longitude.

- |                                       |          |
|---------------------------------------|----------|
| 1. Longitude of the Sun, 'S' .. ..    | 9°.00    |
| 2. Radius Vector of Sun, 'R' .. ..    | 0.98347  |
| 3. Heliocentric longitude of Budha, H | 200.0272 |
| 4. Radius Vector of Budha, 'r'        | 0.38472  |

To find out the geocentric longitude, the following is the formula.

$$\tan P = \frac{r \cdot \cos b \cdot \sin (H-S)}{R + r \cdot \cos b \cdot \cos (H-S)} = \frac{V}{W}$$

Substituting values,  $(H-S) = 200^\circ.0272 - 9^\circ.0 = 191^\circ.0272$

$$\begin{aligned} \tan P &= \frac{0.38472 \times \cos 6^\circ.9845168 \times \sin 191^\circ.0272}{0.98347 + 0.38472 \times \cos 6^\circ.9845168 \times \cos 191^\circ.0272} \\ &= \frac{0.38472 \times 0.992579 \times -0.1912749}{0.98347 + 0.38472 \times 0.992579 \times -0.9815364} \\ &= \frac{0.0730411}{0.6086555} = -0.1200039 \quad P = 6^\circ.842988. \end{aligned}$$

Since V is negative and W is positive, subtracting from  $360^\circ$ ,

we get P as  $353^\circ.157$

- |   |                   |
|---|-------------------|
| 1. Longitude of the Sun 'S'                           | $9^\circ.00$      |
| 2. Adding   | $362^\circ.157$   |
| 3. Ayanamsa for 4433 B.C.                             | $19^\circ.965$    |
| 4. Adding (2) & (3) we get the geocentric longitude   | $382^\circ.122$   |
| at 12 Noon Greenwich or at 17h. 23m. 5s. LMT          | or $21^\circ.122$ |
| on the 11th February, 4433 B.C.                       |                   |
| 5. Motion of Budha in 6.58 hours at $0^\circ.1705156$ |                   |
| per hour for the birth time of Sri Rama at 10h.       | $1^\circ.122$     |
| 47m. 48s., A.M. LMT on the 11th February,             |                   |
| 4433 B.C.   |                   |





6. Subtracting (5) from (4), we get

21°.00

So the Geocentric Longitude of Budha  
at the time of birth of Sri Rama  
at 10h. 47m. 48s. on the 11th February,  
4433 B.C. is 21°.00

**NOTE:**

Sage Valmiki has given the longitudes of Sun, Moon, Kuja, Guru and Saturn, correct to the second; he has not given the longitude of Budha. The most modern method of calculating the longitudes have been adopted and found correct for the planets for which Valmiki has given the longitudes. The same method is adopted for Budha. So the longitude of 21°.00 arrived at by calculation must be correct.

*Even the carnivora refuse to feed on the flesh of those ungrateful beings when they are dead, who though having achieved their own end, actually fail to be of any service to their beneficent friends whose object has not yet been accomplished.*

- Kishkinda Kanda - Bala Kanda 4  
Canto 30 - Verse 73

## BUDHA

## SECTION VI

Conversion of Heliocentric latitude into Geocentric Latitude:

- |  |         |
|--|---------|
| 1. Longitude of the Sun, 'S' .. ..                   | 9° 00'  |
| 2. Radius Vector of Sun, 'R' .. ..                   | 0.98347 |
| 3. Heliocentric Longitude of Budha, 'L' 191° 02' 72" |         |
| 4. Heliocentric latitude of Budha, 'b' .. ..         | 0.38472 |

Since P, 353°.6977 is near 360° i.e., between 315° and 45°, the formula applicable is

$$\begin{aligned}
 \tan y &= \frac{r \cdot \sin b \cdot \cos P}{R + r \cdot \cos b \cdot \cos (H-S)} = \frac{C}{V} \\
 &= \frac{0.38472 \times \sin 6.9845168 \times \cos 353^\circ.69777}{0.98347 + 0.38472 \times \cos 6.9845168 \times \cos 191.0272} \\
 &= \frac{0.38472 \times 0.1216 \times 0.9939566}{0.98347 + 0.38472 \times 0.992579 \times -0.9815364} \\
 &= \frac{0.0464996}{0.6086555} \\
 &= 0.0763972 \\
 y &= 4^\circ 36' 75.26'' \text{ or } 4^\circ 22' 7''.51
 \end{aligned}$$

Since both C and V are positive, the latitude is Northern. Thus the Geocentric Latitude at the time of the birth of Sri Rama is

4°.367526 (North)

or

4° 22' 7".51 (North)

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GURU

To find the longitude and latitude of Guru at 17h. 23m. 5 Secs. (LMT)  
at Ayodhya, India i.e., Noon Greenwich on the 11th February, 4433 B.C.

SECTION I.

- (a) The columns denoted by L, g and U in the following tables give the values of the Mean Longitude, Mean anomaly and the Mean Argument of latitude of Guru. These are derived from the following formulae.

- (b) Let L be the mean longitude of Guru in its undisturbed orbit.

Let g be the mean anomaly

Let U be the argument of latitude.

Let T be the time reckoned in Julian centuries of 36525 days from the epoch 1900 A.D., January, 0.5 day i.e., Noon Greenwich. This is done in continuation of C.G Rajan's Tables for Jupiter.

$$(1) L = 238^{\circ}.0496 + 10930687''.148 T - 1''.20486 T^2 - 0''.005936 T^3.$$

$$(2) g = 225^{\circ}.32833 + 10924891''.286 T - 2''.59772 T^2 - 0''.06314 T^3$$

$$(3) U = 138^{\circ}.60587 + 10927049''.24 T - 0''.06314 T^2 - 0''.024704 T^3$$

- (c) Now in the motion of L, putting  $l = 10930687''.148 T$  we have

for one century of 25 leap years,  $l = (8) 156^{\circ} 20'$

for one ordinary year of 365 days,  $l = 30^{\circ} 20'$

$32''.05500397$

for one hour in 365 days a year,  $l = 0^{\circ} 0' 12''.46941.$

- (d) In the motion of g putting  $a = 10924891''.286 T$ , we have,  
for one century of 25 leap years,  $a = (8) 154^{\circ} 43'$   
for one ordinary year of 365 days,  $a = 30^{\circ} 19' 35''$

- (e) In the motion of U, putting  $b = 10927049''.24 T$ , we have,  
for one century of 25 leap years,  $b = (8) 155^{\circ} 19'$   
for one ordinary year of 365 days,  $b = 30^{\circ} 19'$

$56.700824093.$

(r stands for one complete revolution of 360 degrees)

## SECTION II.

## GURU

TABLE 1.

## Secular variation – Part 1.

| B.C. Years | L<br>o    | g<br>o    | U<br>o    |
|------------|-----------|-----------|-----------|
| 3200       | 0.8705555 | 0.7633055 | 0.9543888 |
| 3300       | 0.9041666 | 0.7491945 | 0.9526886 |
| 3400       | 0.9377777 | 0.6030835 | 0.9509333 |
| 3500       | 0.9713888 | 0.5834166 | 0.9491271 |
| 3600       | 1.0049999 | 0.5632219 | 0.9473104 |
| 3700       | 1.0386111 | 0.5430272 | 0.9454991 |
| 3800       | 1.0722221 | 0.5223604 | 0.9436878 |
| 3900       | 1.1058332 | 0.5011936 | 0.9418764 |
| 4000       | 1.1394443 | 0.4795818 | 0.9399814 |
| 4100       | 1.1730544 | 0.4573591 | 0.9390864 |
| 4200       | 1.2066665 | 0.4346086 | 0.9361639 |
| 4300       | 1.2402776 | 0.407586  | 0.9341859 |
| 4400       | 1.2738887 | 0.3800634 | 0.9322079 |
| 4500       | 1.3074998 | 0.3520958 | 0.9302298 |
| 4600       | 1.3411109 | 0.3235173 | 0.9278948 |
| 4700       | 1.374722  | 0.2944111 | 0.9258056 |
| 4800       | 1.4083331 | 0.2648067 | 0.9237164 |
| 4900       | 1.4419442 | 0.2347534 | 0.9216272 |
| 5000       | 1.4755553 | 0.2042576 | 0.9195379 |

*Many righteous souls in the world who have practised  
virtue enjoined on them have perished with their  
followers through the offences of others.*

*- Aranya Kanda - Canto 42 - Verse 13*

## GURU

TABLE 2.

## Secular Variation — Part 2.

| B.C. Years | L<br>o    | g<br>o    |
|------------|-----------|-----------|
| 3200       | 1.2187222 | 0.7633055 |
| 3300       | 1.2171624 | 0.7449456 |
| 3400       | 1.2156026 | 0.7261412 |
| 3500       | 1.2140428 | 0.7068923 |
| 3600       | 1.2124831 | 0.6870323 |
| 3700       | 1.2109232 | 0.6667001 |
| 3800       | 1.2093634 | 0.6464152 |
| 3900       | 1.2078036 | 0.6212093 |
| 4000       | 1.2062438 | 0.5956034 |
| 4100       | 1.2046841 | 0.5695553 |
| 4200       | 1.2031243 | 0.5428915 |
| 4300       | 1.2015644 | 0.5157578 |
| 4400       | 1.2000037 | 0.4885714 |
| 4500       | 1.1984448 | 0.4609405 |
| 4600       | 1.1968851 | 0.4326985 |
| 4700       | 1.1953292 | 0.4039843 |
| 4800       | 1.1937654 | 0.374729  |
| 4900       | 1.1922056 | 0.3455615 |
| 5000       | 1.1906458 | 0.315739  |

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*In a rulerless land people do not quickly move out  
decked with ornaments in chariots driven by spirited  
horses of excellent breed.*

*-Ayodhya Kanda - Canto 67 - Verse 25*

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## GURU

## SECTION III.

## (a) Calculation of Equation of Centre of Guru; 'f'

In section IV, we get the value of 'g' as  $324^{\circ}.97945$ .

Extract from Table 9 of C.G. Rajan's Tables for Equation of Centre of Jupiter 'f':

| g  | $f_1$                | g   |
|----|----------------------|-----|
| 35 | $3^{\circ} 20' 30''$ | 325 |
| 36 | $3^{\circ} 25' 18''$ | 324 |

When g is between  $180^{\circ}$  and  $360^{\circ}$ ,  $f_1$  is negative.

So for  $g = 324.97945$ ,  $f_1 = -3.433107$  (by rule of three)

Extract from Table 10 of C.G. Rajan's Tables for Equation of Centre of Guru 'f<sub>2</sub>':

| g  | $f_2$  | g   |
|----|--------|-----|
| 35 | $39''$ | 325 |
| 36 | $40''$ | 324 |

When g is between  $180^{\circ}$  and  $360^{\circ}$ ,  $f_2$  is negative.

So, for  $g = 324.97945$ , 'f<sub>2</sub>' is  $-0.010833$ . (by rule of three).

$$f = f_1 + f_2 = -3.3433107 + -0.010833 = -3.354144$$

## (b) Radius Vector Guru: 'r'.

Value of 'g' is  $324^{\circ}.97945$ .

Extract from Table 14(a) of C.G. Rajan's Tables for Guru 'r':

| g  | r      | g   |
|----|--------|-----|
| 35 | 4.9930 | 325 |
| 36 | 4.9958 | 324 |

So for  $g = 324.97945$ ,  $r = 4.9930575$  (by rule of three)

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## GURU

(c) Calculation of Reduction to the Ecliptic of Guru 'M':

|  |              |
|--|--------------|
| 1. Argument of latitude of Guru (Section IV)   | 279°.86145   |
| 2. Secular variation, Part 1   | - 0°.9341859 |
| 3. Constant Correction   | - 1°.000     |
| 4. Equation of Centre 'f'  | - 3°.354144  |
| 5. Adding (1) to (4) algebraically, we get U as  | 274°.57312   |
| 6. Extract from Table 12 of C.G. Rajan's<br>Tables for Jupiter for the Reduction to the<br>ecliptic 'M': |              |

(When U is greater than 180°, take  $U - 180^\circ$  and apply this table).  
and apply this table.

| U  | M  |
|----|----|
| 94 | 2" |
| 95 | 3" |

Therefore, for  $U = 274^\circ.57312$ ,  $M = -0.00083$  (by rule of three)

(d) Calculation of Heliocentric latitude of Guru 'b':

We have seen above that 'U' after correction is  $274^\circ.57312$ .

When U is greater than 180°, we have to take  $U - 180^\circ$  i.e.,  
 $94^\circ.57312$ .

Extract from Table 13 of C.G. Rajan's Tables of Jupiter 'b<sub>1</sub>':

Latitude of Guru 'b<sub>1</sub>'

| U   | b <sub>1</sub> |
|-----|----------------|
| 274 | 1° 18' 19"     |
| 275 | 1° 18' 13"     |

Therefore, for  $U = 274^\circ.57312$ , 'b<sub>1</sub>' = -1.3043226 (by rule of three). Since U is between 180° and 360°, b<sub>1</sub> is negative or Southern.

## GURU

(e) Calculation of The Great Inequality (or Long Period Inequality): 'E'

In his Table 8 of the Great Inequality (or Long Period of Inequality, C.G. Rajan has given the values of this inequality 'E'

for a period from 1800 A.D. to 2100 A.D. from the following formula.

$E = (1186''.618572 - 0''.0347004t + 0''.000033372t^2) \sin c - 12''.013596 \sin 2c$ , where  $c = 95^\circ.8814 + 0^\circ.38633184t + 0^\circ.00000351t^2$ , and  $t$  is the number of years from 1800 A.D.,  $t$  being positive for year after 1800 A.D. and negative for year before 1800 A.D.

However since  $E$  will not increase  $0^\circ 36' 35''$  in any case, this value is adopted. So  $E$  is  $0^\circ.609722$ .

(f) Calculation of inequalities of Jupiter (planetary perturbations) 'p':

(from Table 11 of C.G. Rajan's Tables of Jupiter)

We have  $J = 74^\circ$ , Saturn 'S' =  $184^\circ.85477$  and  $t = 6233$ .

|   | (+) | (-) |
|---|-----|-----|
|   | "   | "   |
| 1. $(74 - 184^\circ.85477 - 1^\circ 9' 7'') \Rightarrow A = -248$                             |     | 75  |
| 2. $(2 \times 74) - (2 \times 184.85477) - 0^\circ 35' 6'' = B = -137.7$                      |     | 134 |
| 3. $(3 \times 74) - (3 \times 184.85477) = C = 27.45$   |     | 8   |
| 4. $74 \times (2 \times 184.85477) + 15.26 \times 6233 = D = 104.06$                          |     | 130 |
| 5. $(2 \times 74) - (4 \times 184.85) + 28^\circ 36' 7'' = E = 157.2$                         |     | 32  |
| 6. $(2 \times 74) - (3 \times 184.85) - 61^\circ 33' 36'' = F = 297$                          |     | 48  |
| 7. $(3 \times 74) - (5 \times 184.85) + 56^\circ 23' 6'' + 50''.51 \times 6233 = G = -161.59$ |     | 50  |
| 8. $(3 \times 74) - (4 \times 184.85) - 62^\circ 48' 7'' = K = -139.8$                        |     | 10  |
| 9. $(3 \times 74) - (2 \times 184.85) - 8^\circ 48' 410'' = P = 203.49$                       |     | 5   |
| 10. $(2 \times (184.85 - 74) + 68^\circ 12' 7'' = Q = 3.9$                                    |     | 1   |
| 11. $184.85 - 44^\circ 56' 46'' = V = 139.9$  |     | 7   |
| 12. $(4 \times 74) - (5 \times 184.85) + 58^\circ 0' 50'' = W = 149.76$                       |     | 6   |

Net =  $439 + 67 = -372''$

ie  $-0^\circ.10333$



## GURU

## SECTION IV.

| Abbreviation<br>Explanation           | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Mean<br>Argument of<br>latitude. |
|---------------------------------------|------------------------|----------------------|---------------------------------------|
| 1. Daily motion in deg.               | 0.0831305              | 0.0830861            | 0.0831027                             |
| 2. Movement in one year<br>in degrees | 30.342633              | 30.326427            | 30.332514                             |
| 3. Movement per century<br>in degrees | 156.34142              | 154.71971            | 155.32887                             |

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| Description  | o          | o          | o          |
|--|------------|------------|------------|
| 4. Mean longitude in<br>1900 A.D.                                    | 238.0496   | 225.32833  | 138.60587  |
| 5. Movement in 63 <sup>7</sup><br>centuries                          | 129.50946  | 27.34173   | 65.71884   |
| 6. Mean longitude on<br>4400 B.C., 0.5 day<br>(adding algebraically) | 7.55906    | 252.67006  | 204.32471  |
| 7. Movement in<br>33.115068 years                                    | 284.79836  | 284.26169  | 284.46326  |
| 8. Mean longitude on<br>the 11th Feb. 4433 B.C.                      | 82.7607    | 328.40837  | 279.86145  |
| 9. Correction for secular<br>variation-part 1                        | 1.2738887  | -0.3800634 | -0.9341859 |
| 10. -do- Part 2  | -1.2000037 | -0.4885714 | -          |
| 11. Adding algebraically<br>(8) (9) & (10)                           | 82.834585  | 327.97945  | 278.92726  |
| 12. Constant Correction  | -          | -3.0       | -1.00      |
| 13. Correction for<br>inequalities 'P'                               | -0.103333  | -          | -          |
| 14. Correction for the<br>long period<br>inequality 'E'              | 0.609722   | -          | -          |

|  |            |           |           |
|--|------------|-----------|-----------|
| 15. Reduction to the<br>ecliptic 'M'     | - 0.00083  |           |           |
| 16. Adding algebraically<br>(11) to (15) | 83.340144  | 324.97945 | 277.92726 |
| 17. Equation of centre                   | - 3.354144 |           |           |
| 18. Heliocentric Long.                   | 79°.986    |           | 274.57312 |

## GURU

## SECTION V.

Conversion of Heliocentric longitude into Geocentric longitude:

|                                   |            |
|-----------------------------------|------------|
| (a) Longitude of Sun, 'S'         | 9°.0       |
| Radius Vector of Sun, 'R'         | 0.98347    |
| Heliocentric longitude 'H'        | 79°.986    |
| Radius Vector of Guru 'r'         | 4.9930575  |
| Heliocentric latitude of Guru 'b' | 1°.3043226 |

- (b) To find the Geocentric longitude of Guru, the formula is,

$$\tan P = \frac{r \cdot \cos b \cdot \sin(H - S)}{R + r \cdot \cos b \cdot \cos(H - S)} = \frac{V}{W}$$

Substituting values,  $(H - S) = 79°.986 - 9°.0 = 70°.986$ .

$$\begin{aligned} \tan P &= \frac{4.9930575 \times \cos 1°.3043226 \times \sin 70°.986}{0.98347 + 4.9930575 \times \cos 1°.3043226 \times \cos 70°.986} \\ &= \frac{4.9930575 \times 0.9997408 \times 0.945439}{0.98347 + 4.9940575 \times 0.9997408 \times 0.3257991} \\ &= \frac{4.9917633 \times 0.945439}{0.98347 + 4.9917633 \times 0.3257991} \\ &= \frac{4.7194077}{2.6097824} = 1.8083532 \quad P = 61°.057875 \end{aligned}$$

|                                   |            |
|-----------------------------------|------------|
| (c) P                             | 61°.057875 |
| Sun's longitude                   | 9°.0       |
| Adding                            | 70°.057875 |
| Ayanamsa                          | 19°.965    |
| Adding                            | 90°.022875 |
| Movement of Guru in 6.58 hours at | 0°.0227916 |
| 0°.0034637708 per hour for the    |            |
| birth time of Sri Rama at 10h.    |            |
| 47m. 48 secs. (LMT)               |            |
| Subtracting                       | 90°.000083 |
| Longitude of Guru at the time of  |            |
| Sri Rama's birth as given by      |            |
| Valmiki                           | 90°.000278 |

*In the absence of a stable government even those, who do not believe in life after death and have flagrantly violated the rules of conduct prescribed by the Vedas and who have been tormented with punishment inflicted by the king and whose fear of punishment has now been dispelled by the anarchy prevailing at the time, are able to exercise authority over others.*

*-Ayodhya Kanda - Canto 67 - Verse 32*

## GURU

## SECTION VI

Conversion of heliocentric latitude into geocentric latitude.

In Section III (d), we got the heliocentric latitude of Guru as  
 $-1^{\circ}.3043226$  (South)

We know, that

|                                      |   |                     |
|--------------------------------------|---|---------------------|
| P                                    | = | $61^{\circ}.057875$ |
| Heliocentric longitude of 'Guru' 'H' | = | $70^{\circ}.986$    |
| Radius Vector of Guru 'r'            | = | $4.9930575$         |
| H - S                                | = | $61^{\circ}.057875$ |

Since P is between  $45^{\circ}$  and  $135^{\circ}$  the formula applicable is

$$\tan y = \frac{r \cdot \sin b \cdot \sin P}{r \cdot \cos b \cdot \sin (H - S)} = \frac{C}{V}$$

Substituting values,

$$\begin{aligned} \tan y &= \frac{4.9930575 \times \sin 1^{\circ}.3043226 \times \sin 61^{\circ}.057875}{4.9930575 \times \cos 1^{\circ}.3043226 \times \sin 70^{\circ}.986} \\ &= \frac{4.9930575 \times 0.0227627 \times 0.8751089}{4.9930575 \times 0.9997408 \times 0.945439} \\ &= \frac{0.0991611}{4.9930575} = 0.0210749 \end{aligned}$$

$$y = 1^{\circ}.2073247 \text{ or } 1^{\circ} 12' 26''$$

Since C and V are both positive, the latitude is NORTHERN.

So the Geocentric Latitude of Guru at the time of the birth of Sri Rama at 10h. 47m. 48secs. (LMT) at Ayodhya, India or 5h. 22m. 12 secs. (GMT) on the 11th February, 4433 B.C., is  $1^{\circ} 12' 26''.3$  (North)

## SUKRA.

To find the longitude and latitude of Sukra at 17<sup>h</sup>. 23<sup>m</sup>. 5 secs. LMT. at Ayodhya, India, i.e., Noon, Greenwich on the 11th February, 4433 B.C.

## SECTION I.

(a) The columns denoted by L, g and U in the following tables give the values of the Mean Longitude, Mean Anomaly and the Mean Argument of Latitude, of Sukra for centuries. These are prepared from the following formulae.

(b) Let L be the mean longitude of Sukra in its undisturbed orbit.  
Let g be the mean anomaly.

Let U be the argument of latitude.

Let T be the time reckoned in the Julian centuries of 36525 days from the epoch 3200 B.C., January, 0.5 day i.e., Noon, Greenwich.

$$(1) L = 282^{\circ}.18561 + 210669162''.88T + 1''.1148T^2 \quad 341^{\circ} 97' 03''$$

$$(2) g = 223^{\circ}.83111 + 210664093''.95T + 4''.63T^2 \quad 214^{\circ} 34' 22''$$

$$(3) U = 252^{\circ}.31206 + 210665923''.42T + 0''.3612T^2 \quad 266^{\circ} 59' 25''$$

(c) Now in the motion of L, putting  $l = 210669162''.88T$ , we have  
for one century of 25 leap years,  $l = (162.) 199^{\circ} 12' 42''.88$   
for one ordinary year of 365 days,  $l = (1.) 224^{\circ} 47' 29''.676966461$

for one hour of 365 days,  $l = 0^{\circ} 4' 0''.32531$ .

(d) In the motion of g, putting  $a = 210664093''.95T$ , we have.  
for one century of 25 leap years,  $a = (162.) 197^{\circ} 48' 13''.95$ .  
for one ordinary year of 365 days,  $a = (1.) 224^{\circ} 46' 39''.022361396$

(e) In the motion of U, putting  $b = (162.) 198^{\circ} 18' 43''.42$ .  
for one century of 25 leap years,  $b = (162.) 198^{\circ} 18' 43''.42$ .  
for one ordinary year of 365 days,  $b = (1.) 224^{\circ} 46' 57''.311383984$   
(r stands for one complete revolution of 360 degrees).

## SUKRA.

TABLE 1.

## SECTION II.

| Abbreviation<br>Explanation      | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Argument of<br>latitude |
|----------------------------------|------------------------|----------------------|------------------------------|
| Motion per century<br>B.C. Years | 199°.21191<br>o        | 197°.80387<br>o      | 198°.31206<br>σ              |
| 3200                             | 282.18561              | 223.83116            | 252.29793                    |
| 3300                             | 82.973701              | 26.027278            | 90.60999                     |
| 3400                             | 243.76179              | 188.2234             | 288.92205                    |
| 3500                             | 44.549881              | 350.41952            | 127.234111                   |
| 3600                             | 205.33797              | 152.61564            | 325.54617                    |
| 3700                             | 6.12606                | 314.81176            | 163.85823                    |
| 3800                             | 166.91416              | 117.00788            | 2.17029                      |
| 3900                             | 327.70224              | 279.204              | 200.48235                    |
| 4000                             | 128.49033              | 81.400118            | 38.79441                     |
| 4100                             | 289.27842              | 243.59624            | 237.10647                    |
| 4200                             | 90.06651               | 45.792358            | 75.41853                     |
| 4300                             | 250.8546               | 207.98848            | 273.73059                    |
| 4400                             | 51.642691              | 10.184658            | 112.04265                    |
| 4500                             | 212.43078              | 172.38072            | 310.35471                    |
| 4600                             | 13.218871              | 334.57684            | 148.66677                    |
| 4700                             | 174.00696              | 136.77296            | 346.97883                    |
| 4800                             | 334.79505              | 298.96908            | 185.29089                    |
| 4900                             | 135.58314              | 101.1652             | 23.60296                     |
| 5000                             | 296.37123              | 263.36132            | 221.91501                    |

*The perpetrator of a sinful deed inevitably reaps its terrible consequence when the time occurs even as a tree puts forth its blossom in the proper season.*

- Aranya Kanda - Canto 29 - Verse 8

## SUKRA

TABLE 2.

## Secular Variation

| B.C. Years | L<br>o | g<br>o   | U<br>o   |
|------------|--------|----------|----------|
| 3200       | 0.8056 | 3.344444 | 0.26097  |
| 3300       | 0.962  | 3.472222 | 0.27131  |
| 3400       | 1.1184 | 3.599999 | 0.28185  |
| 3500       | 1.2748 | 3.727777 | 0.29259  |
| 3600       | 1.4312 | 3.855555 | 0.30353  |
| 3700       | 1.5876 | 3.983332 | 0.31467  |
| 3800       | 1.7444 | 4.111111 | 0.32601  |
| 3900       | 1.9004 | 4.238888 | 0.33755  |
| 4000       | 2.0568 | 4.366666 | 0.34929  |
| 4100       | 2.2132 | 4.494444 | 0.36123  |
| 4200       | 2.3696 | 4.622222 | 0.37337  |
| 4300       | 2.526  | 4.749999 | 0.38571  |
| 4400       | 2.6824 | 4.877777 | 0.39825  |
| 4500       | 2.8388 | 5.005555 | 0.41099  |
| 4600       | 2.9952 | 5.133333 | 0.42393  |
| 4700       | 3.1516 | 5.261109 | 0.43707  |
| 4800       | 3.308  | 5.388888 | 0.45041  |
| 4900       | 3.4644 | 5.516665 | 0.46415  |
| 5000       | 3.6208 | 5.644444 | 0.477789 |

*Charity, sacrificial performances, as well as offering oblations into the sacred fire, nay, austerities practised and the Vedas studied have their foundation on birth. Hence one should remain devoted to truth.*

*- Ayodhya Kanda - Canto 109 - Verse 14*

## SUKRA

## SECTION III.

(a) Calculation of Equation of Centre of Venus: 'f':

(i) Extract from Table 7 of C.G.Rajan's Tables of Planet Venus.

| g  | (0)g    | (¼)g    | (½)g    | (¾)g    | (1)g | g      |
|----|---------|---------|---------|---------|------|--------|
| o  | o       | o       | o       | o       | o    | o      |
| 96 | 0 46 36 | 0 46 34 | 0 46 33 | 0 46 31 | 0 46 | 30 263 |
| 97 | 0 46 30 | 0 46 28 | 0 46 27 | 0 46 25 | 0 46 | 23 262 |

Therefore, for  $g = 262^\circ.89585$ ,  $f_1 = -0^\circ.7748$  (by rule of three)

(ii) Extract from Table 8 for Secular Variation of the Equation of Centre of Venus: 'f<sub>2</sub>'.

| g  | f <sub>2</sub> | g   |
|----|----------------|-----|
| o  | o              | o   |
| 97 | 20             | 263 |
| 98 | 19             | 262 |

Therefore, for  $g = 262^\circ.89585$ ,  $f_2 = 0^\circ.0055$  (by rule of three)

$$f = f_1 + f_2 = -0^\circ.7748 + -0^\circ.0055 = -0^\circ.7803$$

(b) Radius Vector of Venus: for  $g = 262.89585$

Extract from Table 13 of C.G.Rajan's Tables of Venus:

| g  | (0)g    | (½)g    | (1)g    | g   |
|----|---------|---------|---------|-----|
| o  | o       | o       | o       | o   |
| 96 | 0.72389 | 0.72394 | 0.73397 | 263 |
| 97 | 0.72397 | 0.72402 | 0.72406 | 262 |

Therefore, for  $g = 262^\circ.89585$ ,  $r = 0.72325$  (by rule of three)

*The proverb is often quoted in the world that surely  
honey does not flow from a Neem tree.*

*-Ayodhya Kanda - 35  
Verse 17*



### SUKRA.

#### (C) Calculation of Reduction to the Ecliptic of Venus in seconds of Arc

1. Argument of latitude of Sukra, U  $0^{\circ}.0444$
2. Adding secular Variation correction of  $0^{\circ}.39825$ , we get  $0^{\circ}.44265$
3. Adding equation of centre, 'f' i.e.,  $-0^{\circ}.7803$ , we get  $359^{\circ}.66235$
4. When U is greater than  $180^{\circ}$ , subtract  $180^{\circ}$  from it,  
take the remainder and apply the following table.  
'M' is negative since U is between 270 and  $360^{\circ}$  deg.
5. Extract from Table 9 of C.G.Rajan's Tables of Venus:

| U | (0)U               | $(\frac{1}{2})U$    | (1)U                | U   |
|---|--------------------|---------------------|---------------------|-----|
| 0 | $0^{\circ} 0' 0''$ | $0^{\circ} 0' 01''$ | $0^{\circ} 0' 03''$ | 179 |

Therefore, for  $U = 359.66235$ , 'M' =  $0^{\circ}.0005627$  by rule of three.

Note: The secular variation of the reduction to the ecliptic has not been taken into consideration as it is very negligible.

#### (d) Calculation of Heliocentric latitude of Venus 'b':

We have seen from above that U after correction is  $359^{\circ}.66235$

Since it is greater than  $180^{\circ}$ , subtract  $180^{\circ}$  and we get  $179^{\circ}.66235$ .

Extract from Table 10 of C.G.Rajan's Table of Venus:

Latitude of Venus: 'b<sub>1</sub>'

| U | (0)U               | $(\frac{1}{2})U$     | (1)U                | U   |
|---|--------------------|----------------------|---------------------|-----|
| 0 | $0^{\circ} 0' 0''$ | $0^{\circ} 01' 47''$ | $0^{\circ} 3' 33''$ | 179 |

Therefore for U of  $359^{\circ}.66235$  'b<sub>1</sub>' =  $0^{\circ}.0199776$  (by rule of three)

Since U is greater than 180 degrees, it is negative.

#### (e) Calculation of secular Variation of latitude in seconds: 'b<sub>2</sub>'

As per Table 11 of C.G.Rajan's Tables of Venus, b<sub>2</sub> is nil for  $179^{\circ}$ . (f) Since  $b = b_1 + b_2$ , 'b' is  $-0^{\circ}.0199776$

152.  
SUKRA

SECTION IV.

| Abbreviation<br>Explanation  | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Mean<br>Argument of<br>latitude. |
|--|------------------------|----------------------|---------------------------------------|
|  | o                      | o                    | o                                     |
| Movement per century   | 199.21191              | 197.80387            | 198.31206                             |
| Movement per year of<br>365 days                                   | 224.79158              | 224.77751            | 224.78259                             |
| Mean daily motion  | 1.6021306              | 1.6021306            | 1.6021361                             |
| Sl. Description<br>No.   |                        |                      |                                       |
| 1. Mean longitude<br>on 3200 B.C.<br>(Table 1)                     | 282.18561              | 223.83116            | 252.29793                             |
| 2. Movement in 12<br>centuries, i.e.,<br>from 3200 to<br>4400 B.C. | 230.54291              | 213.64644            | 219.74472                             |
| 3. Subtracting (2)<br>from (1)                                     | 51.64269               | 10.184658            | 112.04265                             |
| 4. Movement in<br>33.115068 years<br>(for 33 years and<br>42 days) | 243.98846              | 247.83342            | 248.00175                             |
| 5. Adding (3) and (4)  | 295.63113              | 258.01808            | 0.0444                                |
| 6. Secular variation<br>(Table 2)                                  | - 2.6824               | 4.87777              | 0.39825                               |
| 7. Adding (5) and (6)  | 292.94873              | 262.89585            | 0.44265                               |
| 8. Equation of centre<br>'f' Section III (a)                       | - 0.7803               | -                    | - 0.7803                              |
| 9. Reduction to the<br>ecliptic 'M'<br>Section III (c)             | 0.0005                 | -                    | -                                     |
| 10. Adding algebrai-<br>cally (7), (8) and (9)                     | 292.16893              | 262.89585            | 359.66235                             |

## SUKRA

## SECTION V.

Conversion of Heliocentric longitude into Geocentric longitude.

1. Longitude of Sun, 'S' 9°.0
2. Radius Vector of Sun, 'R' 0.98347
3. Heliocentric longitude of Sukra 'H'  
(Section IV) 292°.16893
4. Radius Vector of Sukra 'r'  
(Section III (b)) 0°.72325
5. Heliocentric latitude of Sukra 'b'  
(Section III (d)) 0°.0199776

(b) To find the Geocentric longitude of Sukra, the formula is,

$$\tan P = \frac{r \cdot \cos b \cdot \sin (H - S)}{R + r \cdot \cos b \cdot \cos (H - S)} = \frac{V}{W}$$

Substituting values, (H - S) = 283°.16893

$$\begin{aligned} \tan P &= \frac{0.72325 \times \cos 0°.0199776 \times \sin 283°.16893}{0.98347 + 0.72325 \times \cos 0°.0199776 \times \cos 283°.16893} \\ &= \frac{0.72325 \times \cos 0°.0199776 \times -0.973702}{0.98347 + 0.72325 \times 0.999999 \times 0.2278228} \\ &= \frac{-0.7042299}{1.1482429} = -0.6133109 \quad P = 31° 52' 12.44'' \end{aligned}$$

Since V is negative and W is positive, subtracting from 360°

|                             |            |
|-----------------------------|------------|
| we get P as                 | 328°.47876 |
| Longitude of Sun            | 9°.0       |
| Adding we get               | 337°.47876 |
| Ayanamsa for 4433 B.C.      | 19°.965    |
| Adding we get Nirayana      |            |
| Longitude, at 17h. 23m. 5s. | 357°.44376 |

Less for the movement of Sukra in  
6.58 hours at  $0^{\circ}.0667554$  per hour  
for the birth time of Sri Rama at  
10h. 47m. 48secs. (LMT)

$0^{\circ}.4392508$

Subtracting

$357^{\circ}.00451$

Longitude of Sukra at the birth  
time of Sri Rama as given by  
Valmiki

$357^{\circ}.00$

The difference is only a few  
seconds i.e.,  $16^{\prime\prime}.24$  and is  
negligible.

---

*Even Yama, the God of death, Kubera, son of Visrava, the God of riches, Indira, the ruler of Gods and the very mighty Varuna, the deity presiding over water, can be outstripped by a king of excellent conduct by virtue of such conduct as he combines in his person, all the great virtues of the great.*

*Ayodhya Kanda - Canto 67 - Verse 35*

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## SUKRA

### SECTION VI.

To find the Geocentric Latitude of Sukra:

In Section III (d) we got the value of heliocentric latitude of Sukra as  $-0^{\circ}.0199776$ .

Since P is  $328^{\circ}.047874$  and near  $360^{\circ}$ , the formula to be employed is

$$\tan y = \frac{r. \sin b. \cos P}{0.98347 + r. \cos b. \cos (H - S)} = \frac{D}{W}$$

Substituting values,

$$= \frac{0.72325 \times \sin 0^{\circ}.0199776 \times \cos 328^{\circ}.47874}{0.98347 + 0.72325 \times \cos 0^{\circ}.0199776 \times \cos 283^{\circ}.16843}$$

$$= \frac{0.72325 \times 0.00031486 \times 0.8524462}{0.98347 + 0.72325 \times 0.999999 \times 0.2278143}$$

$$= \frac{0.0001941}{1.1482365}$$

$$= 0.000169$$

$$y = 0^{\circ}.009685$$

$$= 0^{\circ} 0' 34''.87$$

Since D and W are both positive, the latitude is Northern.

So the Geocentric Latitude of Sukra,

at the time of birth of Sri Rama

at 10h. 47m. 48secs. (LMT)

at Ayodhya, India or

5h. 22m. 12 secs. G.M.T.,

on the 11th February, 4433 B.C. is

$0^{\circ} 0' 34''.87$  (North)

## SANI

To find the longitude and latitude of Sani at 17h. 23m. 5sec. (LMT) at Ayodhya, India, i.e., Noon, Greenwich on the 11th February, 4433 B.C.

## SECTION I.

- (a) The columns denoted by L, g, and U in the following tables give the values of Mean Longitude, Mean Anomaly and the Mean Argument of Latitude of Saturn for centuries. These are derived from the following formulae.

- (b) Let L be the mean longitude of Sani in its undisturbed orbit.  
Let g be the mean anomaly.

Let U be the argument of latitude.

Let T be the time reckoned in Julian centuries of 36525 days from the epoch 3200 B.C., January, 0.5 day i.e., Noon Greenwich.

- ~~25.47983~~ ~~26.90483~~
- (1)  $L = 147^{\circ}.9623 - 4404635''.581T - 1''.16835T^2 - 0''.021T^3$   
 (2)  $g = 156^{\circ}.74269 - 4397585''.284T - 1''.80655T^2 - 0''.0376T^3$   
 (3)  $U = 79^{\circ}.704558 - 4401492''.0785T - 1''.7162T^2 - 0''.0019T^3$
- (c) Now in the motion of L, putting  $l = 4404635''.581T$ , we have,  
 for one century of 25 leap years  $l = 143^{\circ} 30' 35''.581$   
 for one ordinary year of 365 days  $l = 12^{\circ} 13' 36''.207722519$   
 for one hour of 365 days a year  $l = 0^{\circ} 0' 5''.02468$ .
- (d) In the motion of g, putting  $a = 4397585''.284T$ , we have,  
 for one century of 25 leap years  $a = (3.) 141^{\circ} 33' 4''.884676715$   
 for one ordinary year of 365 days  $a = 12^{\circ} 12' 25''.753009179$
- (e) In the motion of U putting  $b = 4401492''.0785T$ , we have,  
 for one century of 25 leap years,  $b = (3.) 142^{\circ} 38' 12''.0785$   
 for one ordinary year of 365 days  $b = 12^{\circ} 13' 4''.794213621$ .  
 (r stands for one complete revolution of 360 degrees).

$$\begin{array}{rcl} g = 134.49236 & L = 260.46036 \\ U = 3.88066 & g = 172.74219 \\ & U = 152.43062 \end{array}$$

## SATURN SECTION II.

## SANI

TABLE 1.

| Abbreviation<br>Explanation | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Argument of<br>latitude |
|-----------------------------|------------------------|----------------------|------------------------------|
| Motion per century          | 143°.50988             | 141°.55147           | 142°.63669                   |
| B.C. Years                  | o                      | o                    | o                            |
| 3200                        | 147.9623               | 156.74269            | 79.704558                    |
| 3300                        | 4.45242                | 15.19122             | 297.06788                    |
| 3400                        | 220.94254              | 233.63975            | 154.43118                    |
| 3500                        | 77.432666              | 92.08828             | 11.794488                    |
| 3600                        | 293.92278              | 310.53681            | 229.1578                     |
| 3700                        | 150.4129               | 168.98534            | 86.521108                    |
| 3800                        | 6.91302                | 27.43387             | 303.88442                    |
| 3900                        | 223.39314              | 245.8824             | 161.24773                    |
| 4000                        | 79.88326               | 104.33093            | 18.611038                    |
| 4100                        | 296.37338              | 322.77946            | 235.97435                    |
| 4200                        | 152.8635               | 181.22799            | 93.337658                    |
| 4300                        | 9.35362                | 39.67652             | 310.70097                    |
| 4400                        | 225.84374              | 258.12505            | 168.06428                    |
| 4500                        | 82.333823              | 116.57358            | 25.427588                    |
| 4600                        | 298.82394              | 335.02211            | 242.7909                     |
| 4700                        | 155.31406              | 193.47064            | 100.15421                    |
| 4800                        | 11.804183              | 51.91917             | 128.81623                    |
| 4900                        | 228.2943               | 270.3677             | 174.88083                    |
| 5000                        | 84.784423              | 128.8162             | 32.244138                    |

## SATURN.

Table 2.

## Secular Variation - Part 2.

| B.C. Years | L         | g         | U         |
|------------|-----------|-----------|-----------|
|            | o         | o         | o         |
| 3200       | 0.8438888 | 0.6952777 | 1.2397222 |
| 3300       | 0.8944331 | 0.6446221 | 1.287877  |
| 3400       | 0.9458075 | 0.5931365 | 1.3368832 |
| 3500       | 0.9977319 | 0.054145  | 1.3867087 |
| 3600       | 1.0504863 | 0.489797  | 1.4373642 |
| 3700       | 1.1040706 | 0.437979  | 1.4881297 |
| 3800       | 1.158205  | 0.385364  | 1.5397252 |
| 3900.      | 1.2131694 | 0.332548  | 1.5914307 |
| 4000       | 1.2636387 | 0.278902  | 1.6439662 |
| 4100       | 1.3250281 | 0.225257  | 1.6966117 |
| 4200       | 1.3819725 | 0.171511  | 1.7500872 |
| 4300       | 1.4394168 | 0.116936  | 1.8036727 |
| 4400       | 1.4976824 | 0.06226   | 1.8578277 |
| 4500       | 1.5398489 | 0.117036  | 1.9123532 |
| 4600       | 1.5992232 | 0.172641  | 1.9677087 |
| 4700       | 1.6760941 | 0.228347  | 2.0231742 |
| 4800       | 1.7701816 | 0.284882  | 2.074697  |
| 4900       | 1.8814826 | 0.341518  | 2.1367052 |
| 5000       | 2.0102833 | 0.398984  | 2.1939407 |

*Who on earth will nurture a Neem tree, while felling  
down a mango tree with an axe; and a Neem tree will  
not turn sweet for him who nourishes it with milk*

*Ayodhya Kanda - Canto 35  
Verses 14-15*



## SATURN.

Table 3.

## Secular Variation - Part 2.

| B.C. Years | L         | g         | U         |
|------------|-----------|-----------|-----------|
|            | o         | o         | o         |
| 3200       | 1.7738889 | 2.3855556 | 1.07      |
| 3300       | 1.8021426 | 2.4683332 | 1.0741946 |
| 3400       | 1.8303964 | 2.5541658 | 1.0785559 |
| 3500       | 1.8586501 | 2.6424983 | 1.083056  |
| 3600       | 1.8869038 | 2.7338871 | 1.0877228 |
| 3700       | 1.9151575 | 2.828331  | 1.0925863 |
| 3800       | 1.9434113 | 2.9255526 | 1.0985286 |
| 3900       | 1.971665  | 3.0258292 | 1.1036676 |
| 4000       | 1.9999187 | 3.1286057 | 1.1089454 |
| 4100       | 2.0281724 | 3.2349934 | 1.1158908 |
| 4200       | 2.0564262 | 3.3441588 | 1.123002  |
| 4300       | 2.0846799 | 3.4561019 | 1.1302526 |
| 4400       | 2.1129336 | 3.5711    | 1.1376699 |
| 4500       | 2.1411873 | 3.688598  | 1.1464452 |
| 4600       | 2.1694411 | 3.8097072 | 1.1554172 |
| 4700       | 2.1976948 | 3.8238721 | 1.164528  |
| 4800       | 2.2259485 | 3.975814  | 1.1738055 |
| 4900       | 2.2542022 | 4.1308109 | 1.1832218 |
| 5000       | 2.282456  | 4.2879605 | 1.1928048 |

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*The seers of Vedic Mantras as well as gods have respected truthfulness alone. Indeed a verocious man in this world attains the highest realm, which knows no decay.*

*- Ayodhya Kanda - Canto 109 - Verse 11*

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## SANI.

(C) Calculation of Reduction to the Ecliptic in seconds of arc: 'M'

|                           |                |
|---------------------------|----------------|
| Argument of latitude, 'U' | = 125°.22565   |
| Equation of Centre, 'f'   | = - 3 .4059979 |
| Adding algebraically      | 121°.61965     |

Extract from Table 12 of C.G. Rajan's Tables of Saturn.

Reduction to the ecliptic, 'M':

| U   | M  |
|-----|----|
| o   | "  |
| 121 | 87 |
| 122 | 88 |

Therefore for 121°.81965, 'M' = -87".81965 or -0°.0243943 (by rule of three) When U is between 90 and 180 deg., M is negative.

(d) Calculation of Heliocentric Latitude of Saturn:

Extract from Table 13 of C.G.Rajan's Tables of Saturn:

Latitude of Saturn - 'b'

| U   | b         |
|-----|-----------|
| o   | "         |
| 121 | 2° 8' 10" |
| 122 | 2° 6' 47" |

Therefore for U = 121°.81965, b = 2°.1172136 or 2° 07' 1".97 when U is between 0 and 180 deg., b is positive or northern.

*In a rulerless land festivals in honour of deities in which actors and dancers exhibit their art in a highly escatatic mood and connival gatherings promoting the welfare of the State do not gather strength.*

*- Ayodhya Kanda - Canto 67 - Verse 15*

SECTION III.

(a) Calculation of Equation of Centre of Saturn, 'f':

In Section IV, we get the value of 'g' as 214.2836.  
Extract from Table 9 of C.G.Rajan's Tables of Sani:

Equation of Centre, 'f<sub>1</sub>'

| g   | f <sub>1</sub> | g   |
|-----|----------------|-----|
| 0   | "              | "   |
| 145 | 3° 28' 22"     | 215 |
| 146 | 3° 23' 02"     | 214 |

when 'g' is between 180 and 360 deg., 'f<sub>1</sub>' is negative.

Therefore, for g of value 214°.2836, 'f<sub>1</sub>' = -3°.3838889  
(by rule of three)

Extract from Table 10 of C.G. Rajan's Tables of Saturn, 'f<sub>2</sub>':

Secular Variation of the

Equation of Centre of Saturn, 'f<sub>2</sub>'.

| g   | f <sub>2</sub> | g   |
|-----|----------------|-----|
| 0   | "              | "   |
| 145 | 81             | 215 |
| 146 | 79             | 214 |

When g is between 180 and 360 deg., 'f<sub>1</sub>' is negative.

Therefore, for 'g' as 214.2836, 'f<sub>2</sub>' = 79". 592409 or -0°.022109  
f = 'f<sub>1</sub>' + 'f<sub>2</sub>'. So 'f' = -3°.3838889 + -0°.022109 =  
-3°.4059979.

(b) To find out the Radius Vector of Saturn for g = 214°.2836.

Extract from Table 14 (a) of C.G.Rajan's Tables of Saturn.

Radius Vector of Saturn.

| g   | r        | g   |
|-----|----------|-----|
| 145 | 10.00138 | 215 |
| 146 | 10.00618 | 214 |

Therefore, for g = 214°.2836, r = 10.004819 (by rule of three)

## SATURN.

## SECTION IV

| Abbreviation<br>Explanation                                    | L<br>Mean<br>Longitude | g<br>Mean<br>Anomaly | U<br>Mean<br>Argument of<br>latitude. |
|--|------------------------|----------------------|---------------------------------------|
|  | o                      | o                    | o                                     |
| Movement per century   | 143.50988              | 141.55147            | 142.63669                             |
| Movement per year  | 12.226725              | 12.207153            | 12.217997                             |
| Daily motion   | 0.0334972              | 0.0334444            | 0.033473                              |
| 1. Mean longitude on<br>3200 B.C. 0.5 day.                     | 147.9623               | 156.74269            | 79.704558                             |
| 2. Movement in 12<br>centuries i.e., from<br>3200 to 4400 B.C. | 282.11856              | 258.61764            | 271.64028                             |
| 3. Subtracting for<br>mean longitude on<br>4400 B.C. (Table 1) | 225.84374              | 258.12505            | 168.06428                             |
| 4. Movement in<br>33.1342465 leap<br>years                     | 45.123314              | 44.47481             | 44.834118                             |
| 5. Subtracting for<br>mean longitude on<br>11.22.4433 B.C.     | 180.72043              | 213.65024            | 123.23016                             |
| 6. Correction for<br>Secular Variation<br>— Part 1 (Table 2)   | 1.49824                | 0.0622605            | 1.8578277                             |
| 7. Correction for<br>Secular Variation<br>— Part 2 (Table 3)   | 2.1129336              | 3.5711               | 1.1376699                             |
| 8. Constant Correction   | —                      | — 3.0                | — 1.0                                 |
| 9. Equation of Centre,<br>'f' Section III (a)                  | — 3.4059979            | —                    | — 3.4059979                           |
| 10. Reduction to the<br>ecliptic Section<br>III (c)            | 0.0243943              | —                    | —                                     |
| 11. Adding (5) to (10)<br>algebraically                        | 180.95                 | 214.2836             | 121.81965                             |

# SATURN                      SECTION V.

Conversion of Heliocentric longitude into Geocentric longitude:

- (a) 1. Longitude of Sun, 'S'                       $9^{\circ} 0$   
 2. Radius Vector of Sun, 'R'                      0 .98347  
 3. Heliocentric Longitude of  
    Saturn, H180°.95  
 4. Radius Vector of Saturn, 'r'                      10 .004819  
 5. Heliocentric latitude of Saturn 'b'                       $2^{\circ} .1172136$

(b) To find the geocentric longitude of Saturn, the formula is

$$\tan P = \frac{r \cdot \cos b \cdot \sin(H-S)}{R + r \cdot \cos b \cdot \cos(H-S)} = \frac{V}{W}$$

Substituting values,  $(H-S) = 180^{\circ} .95 - 9^{\circ} .0 = 171^{\circ} .95$

$$\tan P = \frac{10.004819 \times \cos 2^{\circ} .1172136 \times \sin 171^{\circ} .95}{0.98347 + 10.004819 \times \cos 2^{\circ} .1172136 \times \cos 171^{\circ} .95}$$

$$= \frac{10.004819 \times 0.9993173 \times -0.9901482}{0.98347 + 10.004819 \times 0.9993173 \times -0.9901482}$$

$$= \frac{1.4000903}{-8.9160013} = -0.1570311 \quad P = 8^{\circ} .9243461$$

Since V is positive and W is negative,  $P = 180 - a$ .

$$\text{So } 180^{\circ} .00 - 8^{\circ} .9243461 = 171^{\circ} .07565$$

$$\text{Sun's longitude} \quad 9^{\circ} .0$$

$$\text{Adding} \quad 180^{\circ} .07565$$

$$\text{Ayanamsa for 4433 B.C.} \quad 19^{\circ} .965$$

$$\text{Adding} \quad 200^{\circ} .04065$$

Movement of Saturn in 6.58 hours

at  $0^{\circ} .001394$  per hour for the

birth time of Sri Rama at 10h.

$$47\text{m. } 48 \text{ secs. (LMT)} \quad 0^{\circ} .00917$$

$$\text{Subtracting} \quad 200^{\circ} .03148$$

Longitude of Saturn at the time of

Sri Rama's birth as given by

$$\text{Valmiki} \quad 200^{\circ} .00$$

Note: The difference is very negligible.

## SATURN

## SECTION VI.

To find the geocentric latitude of Saturn:

In Section III (d) we got the value of heliocentric longitude of Saturn as  $2^{\circ}.1172136$  (North)

Since P is  $171^{\circ}.07565$  and between  $135$  and  $225^{\circ}$ , the following formula becomes applicable.

$$\tan y = \frac{r. \sin b. \cos P}{R + r. \cos b. \cos (H - S)} = \frac{D}{W}$$

Substituting values,

$$\begin{aligned} \tan y &= \frac{10.004819 \times \sin 2^{\circ}.1172136 \times \cos 171^{\circ}.07565}{0.98347 + 10.004819 \times \cos 2^{\circ}.1172136 \times \cos 171^{\circ}.95} \\ &= \frac{10.004819 \times 0^{\circ}.0369439 \times -0.987894}{0.98347 + 10.004819 \times 0.9993173 \times -0.9901462} \\ &= \frac{-0.3651424}{8.916005} = 0.0409536 \end{aligned}$$

$$y = 2.3451584 \quad \text{i.e., } 2^{\circ} 20' 42''.5$$

Since D and W are both negative, the latitude is Northern.

So the geocentric latitude of Saturn  
at the time of Sri Rama's birth  
at 10h 47m. 48 secs., (LMT) A.M:  
at Ayodhya, India or 5h. 22m. 12s. GMT  
on the 11th February, 4433 B.C.  
is  $2^{\circ} 20' 42''.5$  (North).

## CHAPTER VI.

### SALIENT FEATURES IN THE HOROSCOPE OF SRI RAMA.

|                         |   |   |
|-------------------------|---|---|
| 1. Name                 | : | SRI RAMA                                  |
| 2. Place of birth       | : | Ayodhya, India                            |
|                         |   | Longitude; $81^{\circ} 24'$ (East)        |
|                         |   | Latitude; $26^{\circ} 48'$ (North)        |
| 3. Year of birth        | : | 4433 B.C.                                 |
|                         |   | -1331 Kali                                |
|                         |   | Baahraspatya Varsha, Prabhava             |
| 4. Date of birth        | : | 11th February, 4433 B.C.                  |
|                         |   | Prabhava, Chaitra, Sukla Navami           |
| 5. Julian Day           | : | 102311                                    |
| 6. Time of birth        | : | 13 Ghatikas                               |
|                         |   | 10 hours, 47 min., 48 secs. L.M.T.        |
| 7. Siderial Time        | : | 23 hours, 09 min., 13 secs. (Notional)    |
| 8. Week day of birth    | : | Sunday                                    |
| 9. Janma Lagna          | : | Karkataka                                 |
| 10. Janma Cusp          | : | $90^{\circ} 00' 01''$                     |
| 11. Janma Nakshatra     | : | Punarvasu, 4th Pada                       |
| 12. Balance in Mahadasa | : | 4 years in Guru Maha Dasa                 |
| 13. Nadi amsa at birth  | : | Vasudha                                   |
| 14. Sun Rise            | : | 5 hours, 35 min., 48 secs. A.M.,          |
|                         |   | L.M.T.                                    |
| 15. Sun Set             | : | 6 hours, 28 min., 48 secs. P.M.,          |
|                         |   | L.M.T.                                    |
| 16. Ahas                | : | 32 Ghatikas, 12 Vighatikas                |
| 17. Ratri               | : | 27 Ghatikas, 48 Vighatikas                |
| 18. Ayanamsa            | : | $19^{\circ} 57' 54''$ or $19^{\circ}.965$ |

*planets*

|         |   |          |                       |
|---------|---|----------|-----------------------|
| Ravi    | <del><math>10^{\circ} 0' 0''</math></del> | Jyeshtha | $10^{\circ} 0' 1''$   |
| Chandra | $10^{\circ} 0' 1''$                       | Shukra   | $357^{\circ} 0' 0''$  |
| Kuja    | $298^{\circ} 0' 0''$                      | Shani    | $200^{\circ} 0' 0''$  |
| Budha   | $21^{\circ} 0' 0''$                       | Lagna    | $90^{\circ} 0' 1''$   |
| Rahu    | $120^{\circ} 4' 26''$                     | Ketu     | $300^{\circ} 4' 26''$ |

# POSITION OF PLANETS IN E HOROSCOPE OF SRI RAMA

| Planets | Nirayana<br>Longitude |    |    | Rasi      | Constellation |
|---------|-----------------------|----|----|-----------|---------------|
|         | 0                     | '  | "  |           |               |
| Lagna   | 90                    | 00 | 01 | Karkataka | Punarvasu 4   |
| Ravi    | 9                     | 00 | 00 | Mesha     | Aswini 3      |
| Chandra | 90                    | 00 | 01 | Karkataka | Punarvasu 4   |
| Kuja    | 298                   | 00 | 00 | Makara    | Dhanishta 2   |
| Budha   | 21                    | 00 | 00 | Mesha     | Bharani 3     |
| Guru    | 90                    | 00 | 01 | Karkataka | Punarvasu 4   |
| Sukra   | 357                   | 00 | 00 | Meena     | Revati 4      |
| Sani    | 200                   | 00 | 00 | Tula      | Swati 4       |
| Rahu    | 120                   | 4  | 26 | Simha     | Aslesha 1     |
| Ketu    | 300                   | 4  | 26 | Kumba     | Dhanishta 3   |

|       |                                  |      |                          |
|-------|----------------------------------|------|--------------------------|
| Sukra | Ravi<br>Budha                    |      |                          |
| Ketu  | RASI<br>CHAKRA<br>OF<br>SRI RAMA |      | LAGNA<br>Chandra<br>Guru |
| Kuja  |                                  |      | Rahu                     |
|       |                                  | Sani |                          |

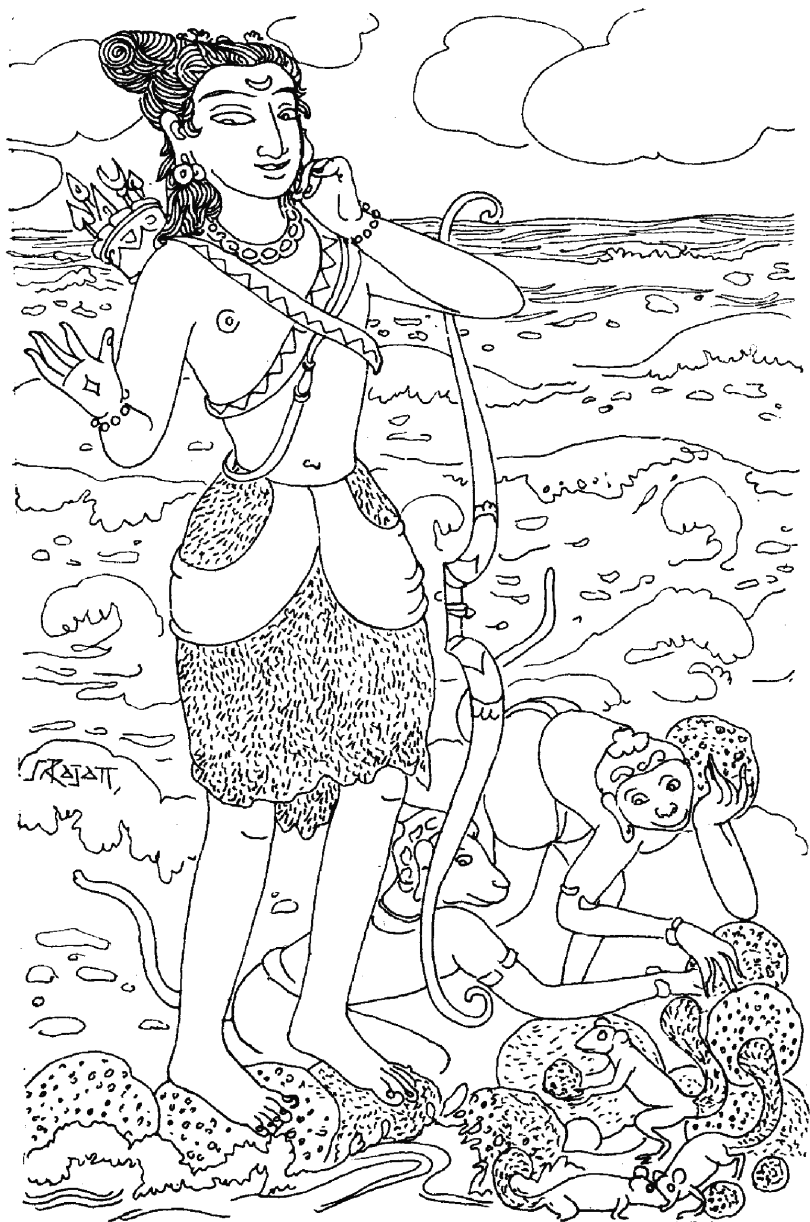


## BHAVA CHAKRA

Indian astrology speaks of Udaya Lagna and also Bhava Chakra ( or the houses) with references to which alone astrological predictions have to be made according to its strict rules and dogmas. Further the Indian astrology advocates the method of making the ecliptic into twelve divisions (houses) with reference to the latitude of the place of birth and the time of birth. This division was in practice during the time of Rama also. Indian astrology condemns the practice of blindly taking the zodiacal signs of equal magnitude of  $30^\circ$  to represent bhavas. While a zodiacal sign is uniformly  $30^\circ$  long, a bhava is of varying magnitude and becomes shorter in higher latitudes. So our next main task is to erect the Bhava Chakra of Sri Rama. To erect the Bhava Chakra, the Udaya Lagna and the cusps of several other Indian bhavas are required. To calculate these, the sidereal time at the time of birth is essential. We can then calculate these cusps from "The Tables of Houses" by Raphael. This book gives the tropical longitudes of the several cusps of European Bhavas for the different latitudes. But we do not know the Siderial Time at the time of birth of Sri Rama. Instead we know the end result i.e., the longitude of the Udaya Lagna, correct to the second. So we can calculate (by proportion i.e., rule of three) the corresponding Siderial Time by reversing the process of calculation. From Raphael's Tables we get the following figures for the Ascendant for  $26^\circ 51' (N)$ .

| Ascendant      | Siderial Time         |
|----------------|-----------------------|
| $90^\circ 40'$ | 23h. 12m. 10s.        |
| $89^\circ 50'$ | 23h. 8m. 28s.         |
| Difference     | 50' or 3000 secs.     |
|                | 3m. 42s. of 222 secs. |

For the birth time of Sri Rama, the corresponding siderial time is 23h. 9m. 13s. Having got the siderial time, we can now calculate the positions of the other cusps for this siderial time, direct in Nirayana longitudes, from Raphael's Tables of Houses.



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| Siderial<br>Time | Cusps    |         |         |           |          |          |
|------------------|----------|---------|---------|-----------|----------|----------|
|                  | 10th     | 11th    | 12th    | Ascndt.   | 2nd      | 3rd      |
| h. m. s.         | o        | o       | o       | o ' "     | o        | o        |
| 23 12 10         | 347      | 21      | 57      | 90 40     | 114      | 138      |
| 23 8 28          | 346      | 20      | 56      | 89 50     | 113      | 137      |
| 3 42             | 1        | 1       | 1       | 50        | 1        | 1        |
| 23 9 13          | 346° 12' | 20° 12' | 56° 12' | 90° 0' 1" | 113° 12' | 137° 12' |

Getting these cusps directly in Nirayana longitude by finding out the corresponding siderial time with the help of the Nirayana longitude of the Udaya Lagna, given by Valmiki, is as good as getting these in European cusps for the actual and siderial time and adopting the Ayanamsa. Our results do not at all get altered or affected in any way. In short, all that we have done from Raphael's Tables is we have found out the corresponding cusps of the other bhavas to the ascendant, since we know the Nirayana longitude of the Ascendant, correct to the arc of second.

Having got thus the cusps of the six bhavas, it is easy to erect the Bhava Chakra. If we add 180 degrees to all these cusps, Viz., Ascendant, 2nd, 3rd, 10th, 11th and 12th, we get the cusps of the 4th, 5th, 6th 7th, 8th and 9th bhavas, as given in the following Table.

| Number of<br>Indian Bhava | Arambha Sandhi<br>(Beginning of<br>the bhava) | Virama Sandhi<br>(Ending of the<br>bhava) |
|---------------------------|---|---|
|                           | o ' "   | o ' "                                     |
| 1st                       | 90 00 01                                      | 113 12 00                                 |
| 2nd                       | 113 12 00                                     | 137 12 00                                 |
| 3rd                       | 137 12 00                                     | 166 12 00                                 |
| 4th                       | 166 12 00                                     | 200 12 00                                 |
| 5th                       | 200 12 00                                     | 236 12 00                                 |
| 6th                       | 236 12 00                                     | 270 00 01                                 |
| 7th                       | 270 00 01                                     | 293 12 00                                 |
| 8th                       | 293 12 00                                     | 317 12 00                                 |
| 9th                       | 317 12 00                                     | 346 12 00                                 |
| 10th                      | 346 12 00                                     | 20 12 00                                  |
| 11th                      | 20 12 00                                      | 56 12 00                                  |
| 12th                      | 56 12 00                                      | 90 00 01                                  |

Valmiki has not left to his posterity any doubt about the beginning of the bhavas. He has clearly stated that the beginning of the 1st bhava is  $90^{\circ} 00' 01''$ . The beginning of the 2nd bhava is the ending of the 1st bhava.

This automatically eliminates the following doubts in some quarters.

1. Whether the longitude of Udaya Lagna is mid point.
2. Whether the mid point is the beginning of the particular bhava.
3. Whether the beginning point is the average of the mid point of the particular bhava and the mid point of its previous bhava.

|  |  |   |  |
|--|--|---|--|
| 9th bhava<br>$317^{\circ} 12'$         | 10th bhava<br>$346^{\circ} 12'$<br>Sukra<br>Ravi | 11th bhava<br>$20^{\circ} 12'$<br>Budha | 12th bhava<br>$56^{\circ} 12'$                                 |
| Ketu<br>8th bhava<br>$293^{\circ} 12'$ | BHAVA<br>CHAKRA<br>OF<br>SRI RAMA                |   | 1st bhava<br>$90^{\circ} 00' 01''$<br>Lagna<br>Chandra<br>Guru |
| 7th bhava<br>$270^{\circ} 12'$         |  |   | 2nd bhava<br>$113^{\circ} 12'$<br>Rahu                         |
| 6th bhava<br>$236^{\circ} 12'$         | 5th bhava<br>$200^{\circ} 12'$                   | Sani<br>4th bhava<br>$166^{\circ} 12'$  | 3rd bhava<br>$137^{\circ} 12'$                                 |

| Planet  | Deity of Shastiamsa | Lord of Shastiamsa | Oradhipathi | Thrimsa adhipathy |
|---------|---------------------|--------------------|-------------|-------------------|
| Lagna   | Indurekha           | Ravi               | Chandra     | Sukra             |
| Ravi    | Mridwamsa           | Kuja               | Ravi        | Sani              |
| Chandra | Indurekha           | Ravi               | Chandra     | Sukra             |
| Kuja    | Kubera              | Sukra              | Ravi        | Kuja              |
| Budha   | Ootpatha            | Kuja               | Chandra     | Budha             |
| Guru    | Indurekha           | Ravi               | Chandra     | Sukra             |
| Sukra   | Kinnara             | Sukra              | Ravi        | Kuja              |
| Sani    | Mukya               | Guru               | Chandra     | Sukra             |

| Quadrants<br>or<br>Kendras            | 1st<br><br>Kataka | 4th<br><br>Tula  | 7th<br><br>Makara | 10th<br><br>Mesha |
|---------------------------------------|-------------------|------------------|-------------------|-------------------|
| Trines or<br>Trikonas                 | 1st<br>Kataka     | 5th<br>Vrischika | 9th<br>Meena      |                   |
| Panapara or<br>(Succeeding<br>houses) | 2nd<br>Simha      | 5th<br>Vrischika | 8th<br>Kumba      | 11th<br>Vrishaba  |
| Apoklimas or<br>Cadent houses         | 3rd<br>Kanya      | 6th<br>Dhanus    | 9th<br>Meena      | 12th<br>Mithuna   |
| Oopachayas                            | 3rd<br>Kanya      | 6th<br>Dhanus    | 10th<br>Mesha     | 11th<br>Vrishaba  |

*Truth alone is God in the world, piety ever hinges on truth. All have their root in birth; there is no goal higher than truth.*

*- Ayodhya Kanda - Canto 109 - Verse 13*

|       |                    |                          |  |
|-------|--------------------|--------------------------|--|
| Sukra | Ravi<br>Budha      |                          |  |
| Ketu  | RASI<br><br>CHAKRA | Lagna<br>Chandra<br>Guru |  |
| Kuja  |                    | Rahu                     |  |
|       |                    | Sani                     |  |

|              |                       |                                     |        |
|--------------|-----------------------|-------------------------------------|--------|
|              | Ravi-1                |                                     |        |
| Sani-2       | DREKANA<br><br>CHAKRA | Lagna-1<br>Chandra<br>- 1<br>Guru-1 |        |
|              |                       |                                     |        |
| Budha<br>- 3 | Sukra<br>- 3          |                                     | Kuja-3 |

|       |                          |                                  |  |
|-------|--------------------------|----------------------------------|--|
|       | Sani                     |                                  |  |
|       | CHATURAMSA<br><br>CHAKRA | Lagna<br>Ravi<br>Chandra<br>Guru |  |
|       |                          |                                  |  |
| Sukra |                          | Kuja<br>Budha                    |  |

|               |                         |                          |  |
|---------------|-------------------------|--------------------------|--|
| Kuja<br>Sukra |                         | Ravi                     |  |
|               | SHASTAMSA<br><br>CHAKRA | Sani                     |  |
|               |                         | Budha                    |  |
|               |                         | Lagna<br>Chandra<br>Guru |  |

|                                  |                        |       |      |
|----------------------------------|------------------------|-------|------|
| Sukra                            |                        |       | Ravi |
| Sani                             | SAPTAMSA<br><br>CHAKRA |       |      |
| Lagna<br>Chandra<br>Kuja<br>Guru |                        | Budha |      |
|                                  |                        |       |      |

|  |                          |       |               |
|--|--------------------------|-------|---------------|
|  | Lagna<br>Chandra<br>Guru |       | Ravi          |
|  | ASHTAMSA<br><br>CHAKRA   | Sukra |               |
|  |                          |       |               |
|  | Kuja                     |       | Budha<br>Sani |

|       |         |       |                                  |
|-------|---------|-------|----------------------------------|
| Sukra |         |       |                                  |
|       | NAVAMSA |       | Lagna<br>Chandra<br>Guru<br>Sani |
|       | CHAKRA  |       |                                  |
|       |         | Budha | Kuja                             |

|                          |         |      |       |
|--------------------------|---------|------|-------|
| Lagna<br>Chandra<br>Guru |         | Kuja | Ravi  |
|                          | DASAMSA |      |       |
|                          | CHAKRA  |      | Sukra |
|                          | Budha   |      |       |

|                          |               |      |       |
|--------------------------|---------------|------|-------|
| Lagna<br>Chandra<br>Guru | Sani          | Kuja | Ravi  |
|                          | DASAMSA       |      |       |
|                          | CHAKRA        |      | Sukra |
|                          | Budha<br>Ketu |      |       |

|      |            |       |                          |
|------|------------|-------|--------------------------|
|      |            | Sukra | Lagna<br>Chandra<br>Guru |
| Kuja | EKADASAMSA |       |                          |
|      | CHAKRA     |       | Budha                    |
| Ravi |            |       |                          |

|               |          |      |                                  |
|---------------|----------|------|----------------------------------|
|               |          | Sani |                                  |
|               | DWASAMSA |      | Lagna<br>Ravi<br>Chandra<br>Guru |
| Sukra         | CHAKRA   |      |                                  |
| Kuja<br>Budha |          |      |                                  |

|               |                          |  |      |
|---------------|--------------------------|--|------|
| Budha         | Lagna<br>Chandra<br>Guru |  | Kuja |
| Sukra<br>Sani | SHODASAMSA               |  |      |
|               | CHAKRA                   |  | Ravi |
|               |                          |  |      |

**CHAPTER VII**  
**CACULATION OF SHAD BALA IN**  
**SRI RAMA'S HOROSCOPE.**

**SALIENT FEATURES IN THE HOROSCOPE OF SRI RAMA:**

- |                         |  |
|-------------------------|--|
| 1. Name                 | : SRI RAMA   |
| 2. Place of birth       | : Ayodhya, India<br>Longitude $81^{\circ} 24'$ (East)<br>Latitude $26^{\circ} 48'$ (North)                           |
| 3. Period               | : Shristiyadi 28th Mahayuga<br>Vaivasvata Manvantra,<br>Treta-Dwapara Sandhi   |
| 4. Year of Birth        | : — 1331 Kali Year<br>Baarhaspatya Varsha PRAHBHAVA<br>4433 B.C.   |
| 5. Date of Birth        | : 11th February, 4433 B.C.<br>By English Calendar.<br>Prabhava Varsha, Chaitra, Sukla<br>Julian Day 102311<br>Navami |
| 6. Time of birth        | : 13 Ghatikas<br>10 hours, 47 minutes, 48 seconds<br>Local Mean Time   |
| 7. Day of Birth         | : Sunday   |
| 8. Janma Lagna          | : Karkataka  |
| 9. Janma Cusp           | : $90^{\circ} 00' 01''$  |
| 10. Janma Nakshatra     | : Punarvasu, 4th Pada  |
| 11. Balance in Mahadasa | : 4 years in Guru Mahadasa   |
| 12. Nadi Amsa at birth  | : Vasudha  |
| 13. Sunrise             | : 5 hours, 35 min. 48 secs. A.M. LMT   |
| 14. Sunset              | : 6 hours, 28 min. 48 secs. P.M. LMT   |
| 15. Ahas                | : 32 Ghatikas, 12 Vighatikas   |



|                         |   |
|-------------------------|---|
| 16. Ratri               | : 27 Ghatikas, 48 Vighatikas  |
| 17. Ayanamsa            | : 19°.965   |
| 18. Kendra or Quadrants | : Karkataka (1st), Tula (4th),<br>Makara (7th) and Mesha (10th)     |
| 19. Trines or Trikonas  | : Vrishchika (5th), Meena (9th)<br>and Karkataka (1st)              |
| 20. Panapara            | : Simha (2nd), Vrishchika (5th),<br>Kumba (8th) and Vrishaba (11th) |
| 21. Apoklimas           | : Kanya (3rd), Dhanus (6th),<br>Meena (9th) and Mithuna (12th)      |
| 22. Oopachayas          | : Kanya (3rd), Dhanus (6th)<br>Mesha (10th) and Vrishaba (11th)     |

**RESIDENTIAL STRENGTH OF THE PLANETS  
IN SRI RAMA'S HOROSCOPE:**

|  | Ravi   | Chandra | Kuja    | Budha  | Guru   | Sukra  | Sani   |
|--|--------|---------|---------|--------|--------|--------|--------|
| House  | 10th   | 1st     | 8th     | 11th   | 1st    | 10th   | 5th    |
| Bhaga  | Poorva | Poorva  | Poorva  | Poorva | Poorva | Poorva | Uttara |
| Longitude<br>in degrees  | 9.0    | 90.000  | 298.000 | 21.00  | 90.00  | 357.00 | 200.00 |
| Arambha<br>(Virama)  |        |         |         |        |        |        |        |
| Sandhi   | 20.2   | 90.000  | 293.2   | 20.2   | 90.00  | 346.2  | 200.2  |
| Aramba<br>Sandhi<br>minus<br>Long ie.<br>Arc of<br>Residential<br>strength | 11.2   | 0.000   | 4.8     | 0.8    | 0.0    | 10.8   | 0.2    |
| Poorva or<br>Uttara<br>Bhaga of<br>a Bhava<br>in degrees                   | 17.0   | 11.6    | 12.0    | 18.0   | 11.6   | 17.00  | 18.00  |

Residential  
Strength  
Poorva or  
Uttara-  
bhaga i.e.,  
Residential  
Strength

0.66      0.00      0.4      0.04      0.00      0.64      0.01

---

### Use of Residential Strength:

The Residential Strength enables one to judge the exact quantity of effect that a planet in a Bhava gives, which may find expression during its dasa. Its application and usefulness can be gauged from the happenings.

For instance, Sukra gives 0.64 unit of the tenth bhava. This effect will materialise during his Dasa or Bukthi. This is only a general statement standing to be modified in the light of other important factors such as, the strength or the weakness of the planets aspecting the Bhavas, the strength of the Bhava itself and the disposition of planets towards particular signs, the Yoga Karakas etc.

In Chapter VI, we have cast the complete horoscope of Sri Rama according to the rules and strict dogmas of astrology. As we have discussed earlier there is only one Rasi Kundali of Sri Rama in vogue till now, wherein it is shown that five planets are in exaltation and the Lagna is Karkataka with Chandra in that sign. A comparison now to Chapter VI would amaze the reader in having obtained almost all the vargas, charts, etc., required for a complete study of Sri Rama's horoscope.

It is our next job to find out how to apply this information for a study of behaviourisms in giving results.

### The strength or bala:

It has been discovered that there are certain behaviourisms amongst planets in their way of giving results. Planets transmit their influences to one another by aspect, conjunction, etc. By virtue of these, they acquire strength or weakness. Now it is our task to identify the sources of strength and quantify them.

**Shad Balas:**

Sri B.V.Raman has published a book "Graha and Bhava Balas". He has followed the Sripathi padhati as far as possible in his text. The author of this book is much attracted by the method of calculation adopted by Sri B.V.Raman. So it is desired to closely follow the text, in calculating the strength of the planets in Sri Rama's horoscope.

**Sources of Strength:**

We often hear that a planet is a greater benefic and another is a greater malefic for a native. These statements are partially true. There are six kinds of balas. They are

1. Sthana Bala or positional strength
2. Dik bala or directional strength
3. Kala bala or temporal strength
4. Chesta bala or motional strength
5. Naisargika bala or permanent strength
6. Drik bala or aspect strength.

The above shad balas give an account of strength and weakness of each house and planet in the horoscope like a balance sheet of assets and liabilities.

**Sthana Bala:**

A planet occupies a certain sign which is friendly, neutral or inimical. It is either exalted or debilitated. It occupies Moolathrikona or is in its own varga. By virtue of these, the planet acquires strength or weakness. This strength or potency is called the Sthana Bala. It consists of

1. Ochcha bala,
2. Saptavargaja bala,
3. Ojayugmarasyamsa bala,
4. Kendra bala and
5. Drekkana bala.

**Unit of measure:**

The balas of planets are measured in Rupas. A Rupa consists of 60 sashtiamsas.

Ochcha bala:

Ochcha bala is the strength of ochcha or exaltation. All planets have certain exaltation points (Ochchabhagas). When a planet occupies its parama ochchabhaga, it gives one rupa or 60 shastiamsas of ochcha bala. When it occupies neechabhaga (debilitation point) it gives no ochcha bala. From the neechabhaga to the ochcha bala, there is a gradual increase of the ochcha bala until at last the bala reaches its maximum at the ochchabhaga. From the exaltation point to the debilitation point there is a gradual decrease till the minimum is reached at the Neechabhaga.

It means that when a planet's longitude, diminished by its debilitation point is in excess of 180° it is to be subtracted from 360° and the difference is to be divided by 3. The result represents ochcha bala of the planet in Virupas or Shastiamsas.

That is,

$$\frac{\text{Planet's longitude} - \text{Its debilitation point}}{180} \times 60$$

$$= \frac{\text{Planet's longitude} - \text{Its debilitation point}}{3}$$

Calculation of ochcha bala in Sri Rama's horoscope:

|                               | Ravi   | Moon   | Kuja   | Budha  | Guru   | Sukra  | Sani   |
|-------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Planet's longitude in degrees | 9.0    | 90.00  | 298.00 | 21.00  | 90.00  | 357.00 | 200.00 |
| Neecha bhaga in deg.          | 190.00 | 213.00 | 118.00 | 345.00 | 275.00 | 177.00 | 20.00  |
| Difference                    | 181.00 | 123.00 | 180.00 | 36.00  | 175.00 | 180.00 | 180.00 |
| Dividing the above by 3       | 60.00  | 41.00  | 60.00  | 12.00  | 58.00  | 60.00  | 60.00  |
| Percent                       | 100.00 | 69.00  | 100.00 | 20.00  | 96.00  | 100.00 | 100.00 |

**Moolathrikonadi Bala:**

Planets have relations amongst themselves. They have relations with the vargas and bhavas also. Certain planets are friends, neutrals and enemies of certain other planets. There are two types of relationships amongst them. They are Naisargika and Tatkalyika.

**Naisargika relationship:**

This means permanent or natural. A planet is a friend, neutral or enemy of another planet in consequence of its nature. The rays or influence of a planet will be intensified by the rays or influence of the friendly planet and counteracted by the rays or influence of the enemical planet. The naisargika relationships are invariably the same in all horoscopes. A Table of natural relationships between planets is given below.

**Permanent Relationship**

| Planet | Mitras           | Sama                    | Satru            |
|--------|------------------|-------------------------|------------------|
| Ravi   | Moon, guru, Kuja | Budha                   | Sani, Sukra      |
| Moon   | Ravi, Budha      | Kuja, Sani, Guru, Sukra | —                |
| Kuja   | Guru, Moon, Ravi | Sani, Sukra             | Budha            |
| Budha  | Ravi, Sukra      | Sani, Guru, Kuja        | Moon             |
| Guru   | Ravi, Moon, Kuja | Sani                    | Budha, Sukra     |
| Sukra  | Budha, Sani      | Kuja, Guru              | Ravi, Moon       |
| Sani   | Sukra, Budha     | Guru                    | Kuja, Moon, Ravi |

**Tatkalika relationship:**

This means temporary or for the time being. As a result of the positions of planets at birth time each stands at a certain relation with the other. The tatkalika relationship changes with reference to the horoscope.

The planets in the second, third, fourth, tenth, eleventh and twelfth houses from any other planet become his Tatkalyika friend. Those in the rest of the houses are Tatkalyika enemies.

The Tatkalyika relationship between the different planets in Sri Rama's horoscope is as follows.

| Planet | Temporary Relationship     |                    |
|--------|----------------------------|--------------------|
|        | Tatkalika Mitru            | Tatkalika Satru    |
| Ravi   | Moon, Guru, Kuja<br>Sukra  | Sani, Budha        |
| Moon   | Sani, Ravi, Budha          | Guru, Kuja, Sukra  |
| Kuja   | Sukra, Budha, Sani<br>Ravi | Moon, Guru         |
| Budha  | Moon, Guru, Kuja<br>Sukra  | Ravi, Sani         |
| Guru   | Sani, Ravi, Budha          | Moon, Kuja, Sukra  |
| Sukra  | Ravi, Budha, Kuja          | Moon, Guru, Sani   |
| Sani   | Kuja, Moon, Guru           | Sukra, Ravi, Budha |

#### Combined or Mixed Relationship:

If a temporary friend also happens to be a permanent friend, they both become intimate friends (Adi Mitras). A temporary friend and a permanent enemy and vice versa becomes a Sama (neutral). A temporary enemy, if he happens to be a permanent enemy becomes a bitter enemy (Adi Satru). Thus we get the following relationships after combining the two, in the horoscope of Sri Rama.

Thus we can see that a planet may be disposed towards another planet as a Mitra, Satru, Sama, Adi Mitra and Adi Satru.

#### Combined Relationship in Sri Rama's Horoscope:

| Planet | Adi Mitru           | Mitru               | Sama                        | Satru                | Adi Satru |
|--------|---------------------|---------------------|-----------------------------|----------------------|-----------|
| Ravi   | Moon, Kuja,<br>Guru | —                   | Sukra                       | Budha                | Sani      |
| Moon   | Ravi, Budha         | Sani                | —                           | Kuja, Guru,<br>Sukra | —         |
| Kuja   | Ravi, Sani          | Sukra               | Ravi, Moon<br>Budha, Guru   | —                    | —         |
| Budha  | Sukra               | Ravi, Kuja,<br>Guru | Moon                        | Sani                 | —         |
| Guru   | Ravi                | Sani                | Moon, Kuja<br>Budha         | —                    | Sukra     |
| Sukra  | Budha               | Kuja                | Ravi, Sani                  | Guru                 | Moon      |
| Sani   | —                   | Guru                | Moon, Kuja,<br>Budha, Sukra | —                    | Ravi      |

### Planets and Vargas:

The relationship between planets enable us to determine a part of sthana bala, viz. saptavargaja bala. For instance, in Sri Rama's horoscope Kuja is in Makara and Sani owns Makara. Sani is Ati Mitru to Kuja and so Kuja occupies a sign of Ati Mitru. Thus the relationship of the other planets are determined and given below.

#### Relationship between planets in Sri Rama's horoscope:

|            |         |       |         |         |         |       |      |
|------------|---------|-------|---------|---------|---------|-------|------|
| Varga      | Ravi    | Moon  | Kuja    | Budha   | Guru    | Sukra | Sani |
| Rasi       | A.Mitru | Swa.  | A.Mitru | Mitru   | Sama    | Sama  | Sama |
| Hora       | A.Mitru | Swa   | Sama    | Sama    | Sama    | Sama  | Sama |
| Drekana    | A.Mitru | Swa   | Sama    | Mitru   | Sama    | Mitru | Sama |
| Saptamsa   | Satru   | Mitru | A.Mitru | Mitru   | Mitru   | Satru | Sama |
| Navamsa    | Satru   | Swa.  | Sama    | A.Mitru | Sama    | Satru | Sama |
| Dwadasamsa | A.Mitru | Swa.  | Sama    | Mitru   | Sama    | Sama  | Sama |
| Thrimamsa  | A.Satru | Satru | Swa.    | Swa.    | A.Satru | Mitru | Sama |

#### Planets occupying more than one swakshetra i.e., varga:

The number of times a planet occupies its own varga the more auspicious it becomes and special results are ascribed to such occupancy of more than one swavarga i.e., swakshetra if a planet occupies its own varga.

|                |     |                  |
|----------------|-----|------------------|
| Twice it is in | ... | Parijatamsa      |
| Thrice "       | ... | Parvathamamsa    |
| Four time "    | ... | Simhasanamamsa   |
| Five " "       | ... | Swargabalamamsa  |
| Six " "        | ... | Indramamsa       |
| Seven " "      | ... | Rajapadmamsa     |
| Eight " "      | ... | Gopuramamsa      |
| Nine " "       | ... | Brahmadamamsa    |
| Ten " "        | ... | Vaishvanamamsa   |
| Eleven " "     | ... | Saivamamsa       |
| Twelve " "     | ... | Vaisheshikamamsa |

#### Finding out the various amams in Sri Rama's horoscope:

Moon occupies swakshetra in the following charts:

Rasi, Drekanamsa,  
Hora, Navamsa, and Dwadasamsa.

Sani occupies swakshetra in Drekan and Saptamsa. Thus Moon gets Swargabalam and Sani parijatamsa.

The other planets have only one swakshetra and hence they have no special amsas.

#### Planets and vargas:

The relations between planets and vargas are required: For instance, in Sri Rama's horoscope, Sani is in Tula sign. The lord of tula is Kuja. Kuja is Ati Mitru to Sani. So Sani occupies an Atimitrushetra or varga. Likewise we have to find out if the other planets occupy their own vargas, enemy's varga, friend's varga, sama varga, ati mitru varga, ati satru varga, in the Rasi, Hora, Drekan, Saptamsa, Navamsa, Dwadasamsa and Thrimsamsa charts. Now let us find out these relations in Sri Rama's horoscope.

#### Relationship between planets in Sri Rama's horoscope:

| Planets | Rasi    | Hora  | Drekan | Saptamsa | Navamsa | Dwadasamsa | Thrimsamsa |
|---------|---------|-------|--------|----------|---------|------------|------------|
| Ravi    | A.Mitru | A.Mit | A.Mit  | Satru    | Satru   | A.Mit      | A.Mitr     |
| Moon    | Swa     | Swa   | Swa    | Mitru    | Swa     | Swa        | Satru      |
| Kuja    | A.Mit   | Sama  | Sama   | A.Mitr   | Sama    | Sama       | Swa        |
| Budha   | Mitru   | Sama  | Mitru  | Mitru    | A.Mitr  | Mitru      | Swa        |
| Guru    | Sama    | Sama  | Sama   | Mitru    | Sama    | Sama       | A.Satru    |
| Sukra   | Satru   | Swa   | Mitru  | Satru    | Satru   | Sama       | Mitru      |
| Sani    | Sama    | Sama  | Swa    | Swa      | Sama    | Sama       | Sama       |

#### Saptavargaja Bala:

A planet on account of its occupancy of the different vargas gets a certain amount of strength. A planet may occupy a Swavarga, a Mitra varga, Satruvarga or it may occupy a special position of Moolathrikona.

A planet in its special Moolathrikona is assigned a value of 45 Shastiamsas; in Swavarga 30 Shastiamsas; in Adi Mitra varga 22.5 Shastiamsas; in Mitra varga 15 Shastiamsas; in Samavarga 7.5 Shastiamsas; in Satruvarga 3.75 Shastiamsas and Adi Satru varga 1.875 Shastiamsas.



It must be noted that 45 Shastiamsas have to be allotted for a planet only when it is in Moolathrikona rasi and not when it occupies any of the six vargas (than Rasi) owned by the planets. Suppose Budha is in Kanya, in Rasi and Navamsa, he gets 45 Shastiamsas only in the Rasi Varga and not in the other case.

**Saptavargaja Balas of planets in Sri Rama's horoscope:**

| Planets         | Ravi    | Moon    | Kuja    | Budha   | Guru   | Sukra  | Sani   |
|-----------------|---------|---------|---------|---------|--------|--------|--------|
| <b>Varga</b>    |         |         |         |         |        |        |        |
| Rasi            | 22.500  | 45.000  | 22.500  | 15.000  | 7.500  | 3.750  | 7.500  |
| Hora            | 30.000  | 30.000  | 7.500   | 7.500   | 7.500  | 7.500  | 7.500  |
| Drekana         | 22.500  | 30.00   | 22.500  | 15.000  | 7.500  | 15.000 | 30.000 |
| Saptamsa        | 3.750   | 15.000  | 22.500  | 15.000  | 15.000 | 3.750  | 30.000 |
| Navamsa         | 3.750   | 30.000  | 7.500   | 22.500  | 7.500  | 3.750  | 7.500  |
| <b>Dwada-</b>   |         |         |         |         |        |        |        |
| <b>samsa</b>    |         |         |         |         |        |        |        |
| Dwada-          | 22.500  | 30.000  | 7.500   | 15.000  | 7.500  | 7.500  | 7.500  |
| Thrim-          |         |         |         |         |        |        |        |
| samsa           | 1.875   | 3.750   | 15.000  | 30.000  | 1.875  | 15.000 | 7.500  |
| <b>Moola</b>    | 106.875 | 183.750 | 105.000 | 120.000 | 54.375 | 56.250 | 97.500 |
| <b>Thrikona</b> |         |         |         |         |        |        |        |
| <b>Bala</b>     |         |         |         |         |        |        |        |

**Ojayugmarasyamsa Bala:**

This is the strength acquired on account of the occupancy of odd and even rasis and Navamsas. Certain planets get strength by occupying Oja(odd) Rasis or Oja Navamsas while others become powerful by residing in Yugma (even) Rasis or Yugma Navamsas. A planet which is to get strength by staying in an Oja Rasi or Oja amsa is assigned a certain value as also the planets which are to get strength by residing in an Yugma Rasi or Yugma Navamsa.

The Moon and Sukra when they are in an even sign or in a Navamsa owned by an even sign get strength of 15 Shastiamsas. The Sun and Kuja, Budha, and Sani when they are in Oja Rasis or Ojamsas get a strength of 15 Shastiamsas. If, for instance, the Moon stays in a Yugma Rasi and Yugma Navamsa, she acquires a strength of 15 plus 15 i.e., 30 Sashtiamsas. Hence we call this Ojayugmarasyamsa Bala.

### Ojayugmarasyamsa Balas in Sri Rama's horoscope:

| Planets     | Ravi  | Moon  | Kuja | Budha | Guru | Sukra | Sani  |
|-------------|-------|-------|------|-------|------|-------|-------|
| Varga       |       |       |      |       |      |       |       |
| Rasi        | odd   | even  | even | odd   | even | even  | odd   |
| Navamsa     | odd   | even  | even | odd   | even | even  | even  |
| Rasi Bala   | 15.00 | 15.00 | 0.0  | 15.00 | 0.0  | 15.00 | 15.00 |
| Navamsa     |       |       |      |       |      |       |       |
| Bala        | 15.00 | 15.00 | 0.0  | 30.00 | 0.0  | 30.00 | 15.00 |
| Yugma-yugma | 30.00 | 30.00 | 0.00 | 30.00 | 0.0  | 30.00 | 15.00 |
| Bala        |       |       |      |       |      |       |       |

### Kendra Bala:

In the Rasivarga, when a planet is in the first, fourth, seventh or tenth house, it is in Kendra Position, and gets 60 Shastiamsas as its Kendra bala. When it is in the second, fifth, eighth, or eleventh house, it is in its Panapara varga and gets 30 Shastiamsas as its strength. When it is in the signs of the third, ninth or twelfth it is in Apoklima varga and gets 15 Sashtiamsas as its strength. All the above three balas must be considered obly in the Rasivarga.

### Determination of Kendra Bala in Sri Rama's horoscope:

| Planets | Kendra or<br>Panapara or<br>Apoklima | Kendra Bala<br>in Sashtiamsas |
|---------|--------------------------------------|-------------------------------|
| Ravi    | Kendra                               | 60                            |
| Moon    | Kendra                               | 60                            |
| Kuja    | Kendra                               | 60                            |
| Budha   | Kendra                               | 60                            |
| Guru    | Kendra                               | 60                            |
| Sukra   | Apokliya                             | 15                            |
| Sani    | Kendra                               | 60                            |

**Drekkana Bala:**

Planets are divided into Masculine (Purusha), Feminine, (Stree) and Hermaphrodite (Napumsaka). A male planet in the first Drekkana gets 15 Shastiamsas of Drekkana Bala, A feminine planet in the 3rd Drekkana gets 15 Sashtiamsas as its Drekkana Bala. A hermaphrodite planet in the second Drekkana gets 15 Sashtiamsas as its Drekkana Bala.

Masculine planets: Ravi, Guru and Kuja.

Feminine planets: Moon and Sukra.

Hermaphrodite planets: Sani and Budha.

**Determination of Drekkana Bala in Sri Rama's horoscope:**

| Planets | Sex       | Drekkana | Drekkana Bala. |
|---------|-----------|----------|----------------|
| Ravi    | Purusha   | 1st      | 15.00          |
| Moon    | Stree     | 1st      | 00.00          |
| Kuja    | Purusha   | 3rd      | 00.00          |
| Budha   | Napumsaka | 3rd      | 00.00          |
| Guru    | Purusha   | 1st      | 15.00          |
| Sukra   | Stree     | 3rd      | 15.00          |
| Sani    | Napumsaka | 2nd      | 15.00          |

Having found out the strength of each constituent, we can now determine the Sthana Bala.

*In a rulerless land, people do not construct assembly halls nor do joyous men plant lovely gardens or build sacred houses such as temples and inns.*

*-Ayodhya Kanda - Canto 67 - Verse 12.*

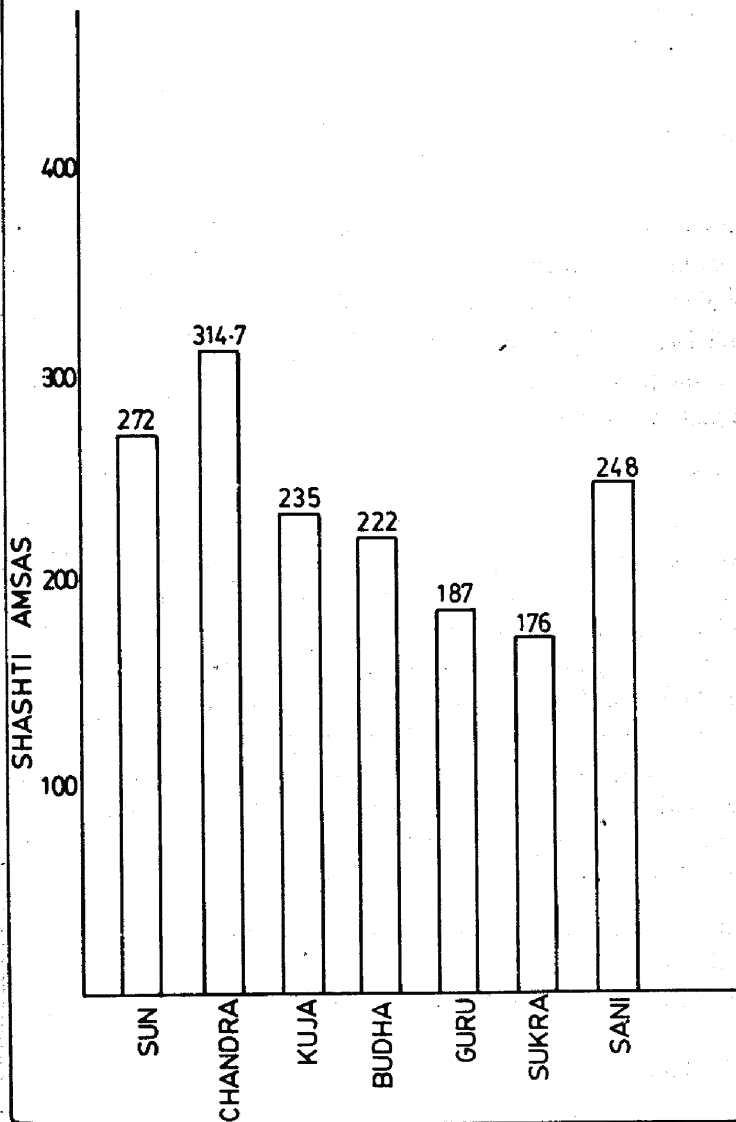
**Determination of Sthana Bala in Sri Rama's horoscope:**

| Planets                      | Ravi    | Moon   | Kuja   | Budha  | Guru    | Sukra  | Sani   |
|------------------------------|---------|--------|--------|--------|---------|--------|--------|
| Ochcha<br>Bala               | 60.000  | 41.000 | 60.0   | 12.00  | 58.000  | 60.000 | 60.00  |
| Sapta<br>vargaja<br>bala     | 106.875 | 183.75 | 115.00 | 120.00 | 54.375  | 56.25  | 97.50  |
| Ojayugma<br>rasyamsa<br>bala | 30.00   | 30.00  | 0.00   | 30.00  | 0.00    | 30.00  | 15.00  |
| Kendra<br>bala               | 60.00   | 60.00  | 60.00  | 60.00  | 60.00   | 15.00  | 60.00  |
| Drekkana<br>bala             | 15.00   | 0.00   | 0.00   | 0.00   | 15.00   | 15.00  | 15.00  |
| Total<br>Sthana<br>bala      | 271.875 | 314.75 | 235.00 | 222.00 | 187.375 | 176.25 | 247.50 |

*In a rulerless land the twice-born given to the performances of sacrifices and self-controlled brahmans observing austere vows do not undertake sacrificial performances in which every one participating in it is both an officiating priest and a sacrificer.*

*-Ayodhya Kanda - Canto 67 - Verse 13.*

## STHANA BALA



**Digbala:**

This means the strength acquired by the planets on account of their occupancy of different directions or Diks in the horoscope.

**Dik or Direction:**

The ascendant represents the eastern direction, the 10th house denotes south; west is indicated by the descendant (7th house) and nadis (4th house) is the northern direction.

**Planets and Dik:**

Each planet in a particular Dik or Direction is supposed to be powerful and gets a certain quantity of strength. Jupiter and Mercury get full directional strength when they occupy the ascendant. The Sun and Mars are powerful in the south i.e., they get full Digbala in the tenth house. Saturn gets full Digbala by being in the 7th house, and the Moon and Venus will become powerful in the north, i.e., when they are in the fourth Bhava they will have complete Digbala.

**Digbala Arc:**

We have seen from the above that certain planets are powerful in certain directions, by occupying which they get full Digbala. This suggests that there are certain powerless points which when occupied give no Digbala. For instance, the Sun gets Digbala in the south (10th house). This is the most powerful point for the Sun. He gets Zero Digbala when he is in the north (fourth house), that is, the powerless point is the fourth house for the Sun. Similarly the 180th degree from the powerful point is the powerless point. The arc of the ecliptic between the longitude of a planet and its powerless point, we shall call as the Digbala arc. A Planet when approaching its powerful point gains Digbala and while reaching the powerless point it gradually loses Digbala.

Parasara says thus: subtract the longitude of the 4th house from the longitudes of the Sun and Mars. Subtract the 7th house from Guru and Budha. Subtract the 10th house from Sukra and the Moon. When the difference in the several cases exceeds  $180^\circ$ , subtract it from  $360^\circ$ . The

**Determination of Digbala:**

A planet at the direction where it is supposed to be most powerful gets a Digbala of 60 Shastiamsas. At the powerless point it will have zero strength (Digbala). At intermediate positions, proportionate reduction must be made. The Digbala Arc of a planet divided by 3, gives the Digbala or directional strength.

**Determination of Digbala in Sri Rama's horoscope:**

| Graha | Longitude<br>(deg) | Powerless point<br>(deg) | Digbala Arc<br>(deg) | Divide by 3<br>to get<br>Shastiamsas |
|-------|--------------------|--------------------------|----------------------|--------------------------------------|
| Ravi  | 9                  | 183.2                    | 174.2                | 58.06                                |
| Moon  | 90                 | 363.2                    | 273.2                | 91.06                                |
| Kuja  | 298                | 183.2                    | 114.8                | 38.26                                |
| Budha | 21                 | 281.6                    | 99.4                 | 33.13                                |
| Guru  | 90                 | 281.6                    | 168.4                | 56.13                                |
| Sukra | 357                | 3.2                      | 6.2                  | 2.06                                 |
| Sani  | 200                | 101.6                    | 98.4                 | 32.8                                 |

**Kala Bala or Temporal Strength:**

This is the temporal strength or strength of time. The strength is calculated by considering the year, month, week-day, time etc., of birth. In other words, the various potencies of planetary vibrations due to seasonal peculiarities are scrutinized. It consists of (1) Nathanmatha Bala, (2) Paksha Bala, (3) Thribaga Bala, (4) Abda Bala or Varshadhipa Bala, (5) Masa Bala, (6) Vara Bala (7) Hora Bala (8) Ayana Bala and (9) Yudha Bala.

**Nathanmatha Bala:**

This is the strength that planets get on account of birth occurring during day or night. This is made up of Diva Bala (diurnal strength) and Ratri Bala (nocturnal strength). This is also known as Divaratri Bala.

The Moon, Sani and Kuja are powerful during midnight. And at midday they are thoroughly powerless. Ravi, Guru and Sukra are powerful during midday and they are utterly powerless at midnight. Budha on the other hand is always powerful be it day or night. Sani, Kuja and Chandra get 60 Shastiamsas at midnight as their Divaratri strength; at midday, Ravi, Sukra and Guru get a similar quantity and Budha always gets 60 Shastiamsas.

### Midday and Midnight:

Midday at any place, is the local noon when the Sun Passes over its meridians. The Hindus consider the apparent noon (which is 12 o'clock midday) and consequently if birth time is marked in local mean time, it must be converted into the apparent time by applying equation of time. The midnight is marked when the Sun is in the lower meridian of the place and this is reckoned at 12 o'clock night.

### Determination of Divaratri Bala in Sri Rama's horoscope:

|                                    |            |
|------------------------------------|------------|
| Birth Time in Local Mean Time:     | 10.48 A.M. |
| Equation of Time:                  | - 2'       |
| Birth Time in Local Apparent Time: | 10.50 A.M. |
| 10 hours at 15 seconds per hour:   | 150°       |
| 50 minutes at 2½' per minute:      | 12.5       |
| Total                              | 162.5      |

$$\text{Diva Bala} = \frac{162^{\circ}.5}{3} = 54.16 \text{ (for Sun, Guru and Sukra)}$$

$$\text{Ratri Bala} = \frac{180 - 162.5}{3} = \frac{17.5}{3} = 5.83 \text{ (for Kuja, Moon \& Sani)}$$

Budha gets always 60 Sashtiamsas.

|                |       |             |
|----------------|-------|-------------|
| Thus Ravi gets | 54.16 | Shastiamsas |
| Moon "         | 5.83  | "           |
| Kuja "         | 5.83  | "           |
| Budha "        | 60.00 | "           |
| Guru "         | 54.16 | "           |
| Sukra "        | 54.16 | "           |
| Sani "         | 5.83  | "           |



### Determination of Paksha Bala in Sri Rama's horoscope:

This is the strength of Paksha Bala or a fortnight. A Paksha is equal to 15 lunar days. The difference between the longitude of Sun and Moon is less than  $180^\circ$ . So the birth is in Sukla Paksha. Paksha Bala of benefics, Moon, Guru and Sukra is

$$\frac{\text{Moon's Longitude} - \text{Sun's Longitude}}{3} = \frac{90 - 9}{3} = 27$$

So the Paksha Bala of Moon, Guru and Sukra is 27 Shasti amsas. 60 minus 27 i.e., 33 Shasti amsas are the Paksha Bala of malefics Ravi, Kuja, Budha and Sani.

The Paksha Bala of Moon is always to be doubled.  
Thus the Paksha Bala of the planets is as follows:

| Planet | Papa or Subha | Paksha Bala        |
|--------|---------------|--------------------|
| Ravi   | Papa          | 33                 |
| Moon   | Subha         | $27 \times 2 = 54$ |
| Kuja   | Papa          | 33                 |
| Budha  | Papa          | 33                 |
| Guru   | Subha         | 27                 |
| Sukra  | Subha         | 27                 |
| Sani   | Papa          | 33                 |

### Determination of Thribhaga Bala in Sri Rama's horoscope:

The birth of Sri Rama has taken place at day time (i.e., 32 Ghatikas, 12 Vighatikas is the duration of the day). It is divided into three equal parts. If the birth is in the first part, Budha in the second part, Ravi and Sani in the third part get 60 Shastiamsas. Now let us calculate the Thribhaga Bala.

Ahas (duration of the day) 32 Gh. 12 Vi.

Birth Time 13 Gh. 00 Vi.

Each thribaga consists of 10.76 Gh.

So the birth of Sri Rama has taken place in the 2nd part.

The second part in a day is ruled by Ravi.

So Ravi gets 60 Sashtiamsas.

Guru always gets 60 Sashtiamsas.

| Planet | Thribaga Bala   |
|--------|-----------------|
| Ravi   | 60 Sashti amsas |
| Guru   | 60 " "          |

**Shristyadhi Ahargana:**

To determine the Abdhabala, Masa bala, Vara bala etc., we require the Shristyadi Ahargana i.e., the number of days (terrestrial) passed from the day of creation. Sri B.V.Raman in his book 'Graha and Bhava Balas', in page 42 has calculated and given the Ahargana for the date 2nd May, 1827 as 714,406,097,641 days. When the difference between the Julian day of this day and the Julian Day on the day of the birth of Sri Rama, is subtracted we get the required Ahargana days.

Now let us calculate the Julian Day for the 2nd May, 1827 A.D. 4713 B.C. is 4712 years.

Adding this to 1827, we get 6539 years.

$$6539 \times 365 = 2386735 \text{ days.}$$

$$\text{Integral part of } (4712 + 1827) + 3 = 1635 "$$

---

4

$$\text{No. of days from 2.5.1827 to 1st Jan} = 121 "$$

$$\text{Total} = 2388491 "$$

$$\text{Less} = 12 "$$

$$\text{Julian Day on the 2nd May, 1827 A.D.} = 2388479$$

$$\text{Subtracting the Julian Day} = 102311$$

$$\text{Difference.} = 2286168$$

**The Abdhadhipathi:**

This is the lord who presides over the year - the year in which Sri Rama is born. This lord is the lord of the week days on which the year began. When 360 the duration of the year is divided by 7, we get a remainder of 3 and the quotient is 51. This quotient represents the number of weeks. The remainder 3 denotes that the first day of any particular year will be three days later than that of the previous one. Therefore, in order to determine the abdhadhipathi the number of days passed from creation to birth must be divided by 360, the quotient taken as representing the number of complete years passed from creation and the remainder rejected. The quotient

must be multiplied by 3 and to the product 1 added, and the resulting sum divided by 7. The quotient is then cast off and the remainder counted from Sunday. This will give the week day of the commencement of the year and its lord will be Abdhadhipathi.

**Finding out the Abdhadhipathi in Sri Rama's horoscope:**

|                                      |         |                 |
|--------------------------------------|---------|-----------------|
| Ahargana days from Shristiyadhi till |         |                 |
| 2nd May, 1827 A.D.                   | —       | 714,406,097,641 |
| Julian Day on 2nd May, 1827 A.D.,    | 2388479 |                 |
| " " on 11.2.4433 B.C.                | 102311  |                 |

|             |         |           |
|-------------|---------|-----------|
| Subtracting | 2286168 | 2,286.168 |
|-------------|---------|-----------|

|                                     |                 |
|-------------------------------------|-----------------|
| Ahargana days till Sri Rama's birth | 714,403,811,473 |
|-------------------------------------|-----------------|

Number of days elapsed since the creation of the world up to the day of Birth

|             |                       |
|-------------|-----------------------|
| of Sri Rama | 714,403,811,473 days. |
|-------------|-----------------------|

|                                  |                      |
|----------------------------------|----------------------|
| Dividing by 360, the quotient is | 19,844,550,031 days. |
|----------------------------------|----------------------|

|                          |                      |
|--------------------------|----------------------|
| Multiplying by 3, we get | 59,533,650,093 days. |
|--------------------------|----------------------|

|                 |                      |
|-----------------|----------------------|
| Adding 1 we get | 59,533,650,094 days. |
|-----------------|----------------------|

Dividing by 7 we get the remainder as 2.

Counting from Sunday, we get Monday as the week day.

Moon is the lord of Monday and hence is the king of the year of birth.

So Moon gets 15 Shastiamsas.

**Masadhipathi:**

The planet that rules the week day of the commencement of the month of birth will be the Masadhipathi or lord of the month. In order to get the Masadhipathi, the number of days elapsed since the creation must be divided by 30, the quotient taken for the number of complete months passed from the creation to the day of Sri Rama's birth. The remainder is rejected. The quotient is then multiplied by 2 and 1 added to the product. The resulting sum is divided by 7, the quotient rejected and the remainder is taken into account. Counting this from Sunday, will give the commencement of the month and its lord will be the Masadhipathi.

**Finding out the Masadhipathi in Sri Rama's horoscope:**

|  |                 |
|--|-----------------|
| Number of days elapsed since the creation of the world up to the day of Sri Rama's birth | 714 403 811 473 |
| Dividing by 30, we get   | 23 813 460 382  |
| Multiplying by 2, we get   | 47 626 920 764  |
| Adding 1, we get   | 47 626 920 765  |

Dividing by 7, we get the remainder as 4.

Counting this from Sunday, we get Wednesday.

So Wednesday is the Week day of the commencement of the month.

Budha is the lord of Wednesday and is the Masadhipathi.

Thus Budha gets 30 Shastiamsas as Masadhipathi.

**Varadhipathi:**

We know that Sri Rama was born on a Sunday. Sun is the lord of Sunday. So Sun is the Varadhipathi and gets 45 Shastiamsas.

**Determination of Hora Bala in Sri Rama's horoscope:**

A day is divided into 24 hours or horas and each hora is ruled by a planet. The planet that rules the hour or the birth gets a value of 60 Shastiamsas. The Hindu day begins with sunrise and continues till next sunrise. The first hora on any day will be the first hour after sunrise. Everyday, the first hora is ruled by the lord of the week day and the lord succeeds according to an order.

Sri Rama's birth has taken place on a Sunday. So the first hora is ruled by Ravi himself. The 2nd is ruled by Sukra, the 3rd by Budha, the 4th by Moon, the 5th by Sani, the 6th by Guru, etc. Now let us calculate the hora bala of Sri Rama:

If the birth time is marked in English hours,

L.M.T. of birth - L.M.T. of sunrise = number of horas  
from sunrise.

Birth time of Sri Rama in L.M.T. 10.48 hours

L.M.T. of sunrise 5.36 hours

Difference 5.12 hours

So it is the 6th hora and the lord is Guru.

Thus Guru gets 60.00 Shastiamsas as Horadhipathi Bala.

**Ayana Bala:**

Each planet will be situated either towards the North or South of the celestial equator and as a result of this circumstance, it gains a certain amount of strength. This strength or potency is known as Ayana Bala.

**Kranty:**

A heavenly body moves northwards the equator for some time and then southwards. This angular distance from the equinoctial or celestial equator is its kranty or the declination. Declinations are reckoned plus or minus according as the planet is situated in the northern or southern celestial hemisphere.

For instance, the Sun cuts the celestial equator twice every year, i.e., once in March and once in September. The declination is always measured in respect of sayana Granha that is a planet reckoned from the movable zodiac point.

The Sun, after cutting the celestial equator in March (when the Aries ingress or Sayana Mesha sankramana takes place) moves northwards and his declination which is plus or positive gradually increases till it is  $24^{\circ}$  ( $23^{\circ} 27'$ ) when the Sun will have reached the last point of Gemini or  $90^{\circ}$  from the beginning of the moving zodiac.  $24^{\circ}$  deg., Kranty means that the Sun has reached the northern most point of the North celestial hemisphere. Then the Kranti falls down gradually along with his Cancer ingress till it is  $0^{\circ}$ , when the Sun will have again crossed the equator to begin his southerly course (i.e., the Libra ingress takes place). Now he will have dakshina Kranty or south declination. He moves southwards. His declination which is now negative or minus gradually increases till its  $24^{\circ}$  ( $23^{\circ} 27'$ ) when the Sun will have reached the last point of Dhanus or  $270^{\circ}$  from the beginning of the moving zodiac. His Capricorn ingress begins. The Kranty decreases gradually till it is again zero when he will have crossed the equator (or entered Sayana Mesha) to begin his northerly course.

### Determination of Kranty:

From the above, it will be evident that the distance of planet from its nearest equinoctial point determines its Kranty or declination. The maximum declination (according to the Hindus) is  $24^\circ$  while modern astronomical savants have it as  $23^\circ 27'$  or so. As the difference between the two values is negligible, for astrological purposes, we may consider  $24^\circ$  as the maximum Kranty of a Sayana planet and adopt it for our calculations.

Modern ephemeris give declinations of planets for Greenwich Noon every day, but since the process involved in their calculation is so simple, we will do well to ascertain the Kranties by applying the rules set forth below.

First convert the Nirayana longitudes of planets at birth into their respective sayana longitudes. Find out their Bhujas. This will give their distance from either the first point of mesha or the first point of Thula. At the end of the first  $15^\circ$  (from one of the two points referred to above) the declination of a planet is 362 minus of arc; at the end of the second  $15^\circ$ , it is greater by 341, i.e., when the planet has advanced  $30^\circ$  (from any one of the two points stated above) its declination is  $362 + 341$  i.e., 703 minutes of arc or  $11^\circ 43'$ ; at the end of the third  $15^\circ$  it is further increased by 299'; at the end of the fourth  $15^\circ$  it is still greater by 236'; at the end of the fifth  $15^\circ$  it is raised by 150' more; and at the end of the sixth it is further increased by 52'.

We can summarize the above observations thus. The maximum declination of  $24^\circ$  is reached when the planet has advanced  $90^\circ$  from any one of the equinoctial points. Six equal divisions of  $15^\circ$  each are made of this  $90^\circ$  and the declination measured as described already.

### Dakshina or Uttara Kranty:

A planet has Dakshina Kranty or south declination when its sayana longitude is between  $180^\circ$  to  $360^\circ$ . It has Uttara Kranty or north declination when the sayana longitude is between  $0^\circ$  to  $180^\circ$ .

## Calculations for Ayana Bala in Sri Rama's horoscope:

| Planet | Sayana<br>Longitude | Bhuja  | No. of<br>Degrees | Division |
|--------|---------------------|--------|-------------------|----------|
|        | o                   | o      |                   |          |
| Ravi   | 9.0                 | 9.0    | 9.0               | 0        |
| Moon   | 90.001              | 89.999 | 14.999            | 5        |
| Kuja   | 278.179             | 81.821 | 6.821             | 5        |
| Budha  | 2.157               | 2.157  | 2.157             | 0        |
| Guru   | 70.058              | 70.058 | 10.058            | 4        |
| Sukra  | 337.479             | 22.521 | 7.521             | 1        |
| Sani   | 180.076             | 0.076  | 0.076             | 0        |

## Kranties of Planets:

|       |                        |             |
|-------|------------------------|-------------|
| Ravi  | 362 + 9/15 × 362       | = 9.65 (N)  |
| Moon  | 1388 + 14/15 × 52      | = 23.99 (N) |
| Kuja  | 1388 + 6.821/15 × 52   | = 23.53 (S) |
| Budha | — 2.157/15 × 362       | = 0.87 (N)  |
| Guru  | 1238 + 10.058/15 × 150 | = 22.3 (N)  |
| Sukra | 362 + 7.521/15 × 341   | = 8.8 (S)   |
| Sani  | — 0.076/15 × 362       | = 0.03 (S)  |

## Determination of Ayana Bala:

The Ayana bala of a planet at the equator is 30 Shastiamsas. This is increased when the planet's declination increases and is additive. The planet's Ayanabala gets reduced proportionately when the Kranty is subtractive.

The Ayana bala is obtained by the following formula which is according to Kesava Daivanya.

$$\frac{24^\circ \pm \text{Kranty}}{48} \times 60 = \text{Ayana bala}$$

48

In case of Sukra, Ravi, Kuja and Guru their north declinations are additive and south declinations are subtractive. In case of Sani and Moon, their south declinations are additive while their north declinations are subtractive. For Budha the declination, north or south, is always additive. And double the Ayanabala in the case of the Sun.

| Planets                       | South or North<br>declination | Additive or<br>-subtractive |
|-------------------------------|-------------------------------|-----------------------------|
| Ravi, Kuja, Guru and<br>Sukra | North                         | Additive                    |
| -do-                          | South                         | Subtractive                 |
| Moon, Sani                    | South                         | Additive                    |
| -do-                          | North                         | Subtractive                 |
| Budha                         | North or<br>South             | Additive                    |

(Double Ayanabala for Sun)

Ayanabala in Sri Rama's horoscope:

$$\text{Ravi } \frac{24 + 9.65}{48} \times 60 = 42.06$$

$$\text{Moon } \frac{24 - 23.99}{48} \times 60 = 0.01$$

$$\text{Kuja } \frac{24 - 23.53}{48} \times 60 = 0.58$$

$$\text{Budha } \frac{24 + 0.87}{48} \times 60 = 30.11$$

$$\text{Guru } \frac{24 + 22.3}{48} \times 60 = 57.87$$

$$\text{Sukra } \frac{24 - 8.88}{48} \times 60 = 18.9$$

$$\text{Sani } \frac{24 + 0.03}{48} \times 60 = 30.04$$

Yudha Bala in Sri Rama's horoscope:

Two planets are said to be in Yudha or fight when they are in conjunction and the distance between them is less than a degree. All the planets excepting Ravi and Moon may enter into the war. The conquering planet is the one whose longitude is less.



In Sri Rama's horoscope Moon and Guru are in the same longitude. But Moon does not enter into war. So there is no Yudha bala involved. No other planets are in the same longitude. Thus there is no Yudha Bala in Sri Rama's horoscope.

#### Total Kala Bala:

To get the total Kala Bala in Sri Rama's horoscope if we add the various items of Kala Bala, arrived at above so far, we get the total kala bala as done below.

| Ravi                   | Moon          | Kuja         | Budha        | Guru          | Sukra         | Sani          |              |
|------------------------|---------------|--------------|--------------|---------------|---------------|---------------|--------------|
| Nathonnatha bala       | 54.16         | 5.83         | 5.83         | 60.00         | 54.16         | 54.16         | 5.83         |
| Paksha Bala            | 33.00         | 54.00        | 33.00        | 33.00         | 27.00         | 27.00         | 33.00        |
| Thribhaga Bala         | 60.00         | —            | —            | —             | 60.00         | —             | —            |
| Abda bala              | —             | 15.00        | —            | —             | —             | —             | —            |
| Masa bala              | —             | —            | —            | 30.00         | —             | —             | —            |
| Vara bala              | 45.00         | —            | —            | —             | —             | —             | —            |
| Hora bala              | —             | —            | —            | —             | 60.00         | —             | —            |
| Ayana bala             | 42.06         | 0.01         | 0.58         | 30.11         | 57.87         | 18.9          | 30.04        |
| Yudha Bala             | —             | —            | —            | —             | —             | —             | —            |
| <b>Total Kala Bala</b> | <b>234.22</b> | <b>74.84</b> | <b>39.41</b> | <b>153.11</b> | <b>259.03</b> | <b>100.06</b> | <b>68.87</b> |

#### Chesta Bala or Motional Strength:

Chesta Bala means Vakra Chesta or act of retrogression. Each planet, except the Sun and the Moon and the shadowy planets, gets into the state of vakra or retrogression when its distance from the Sun exceeds a particular limit. And the strength or potency due to the planet on account of the Arc of retrogression is termed as Chesta Bala.

The facts relating to the phenomenon described in Hindu Astronomical works are of a complicated nature. To enter into discussion of the underlying principles of this phenomenon and to expound them intelligently in this book would amount to enormous work. In

view of this, it is thought fit to give in the subsequent pages a simple method for measuring the Chestrakendra necessary for calculating Chesta Bala.

**Superior and Inferior planets, conjunctions and oppositions:**

The planets Kuja, Guru and Sani are superior planets. The planets Budha and Sukra are inferior planets.

The superior planet when it occupies the same longitude as the Sun is said to be in conjunction with him. It is said to be in opposition when its distance from the sun is exactly  $180^\circ$

**Madhya Grahas:**

The Madhya of a graha is its mean longitude in its path round the Sun. The mean position of a planet is the position which it would have attained at a uniform rate of motion and the correction to be applied in respect of the eccentricity of the orbit is not considered. The mean longitude is reckoned on the assumption that the orbits of planets are concentric circles. Because the orbits are elliptical and not circular, equations are later on applied to the mean positions to get the true longitudes. In Chapter V we have already calculated the mean longitudes of the planets.

**Seegrochcha:**

The seegrochcha is the apogee of the planet. It is required to find out the Chesta Kendra.

**Seegrochcha of Superior Planets:**

The Mean longitude of the Sun will be the Seegrochcha of Kuja, Guru and Sani. So the Seegrochcha of Kuja, Guru and Sani is  $9^\circ$

**Sreegrochcha of Budha.**

|   |               |
|---|---------------|
| Julian Day on 1st January 1900 A.D                  | 2415021       |
| Julian Day on 11th February 4433 B.C.               | 102311        |
| Difference i.e., interval                           | 2312710       |
| Movement of Budha at $4^\circ.09$ per day           | $343^\circ.8$ |
| Correction $6.67 + [(1900 + 4433) \times 0.001333]$ | $15^\circ.1$  |
| Sreegrochcha of Budha on 1900 A.D                   | $164^\circ.0$ |
| Totalling for required sreegrochcha of Budha        | $163^\circ.0$ |

**Sreegrochcha of Sukra:**

|   |                  |
|---|------------------|
| Interval as arrived at above                            | 2312710<br>days. |
| Movement of Sukra for the above days at 1.6°<br>per day | 256°.0           |
| Sreegrochcha on 1900 A.D.                               | 328°.81          |
| Correction 5 + (6333 × 0.001)                           | 11°.33           |
| <b>Total</b>  | <b>596°.14</b>   |
| Expunging 360°  | 236°.14          |
| So the sreegrochcha of Sukra is 236°.14                 |                  |

**Chesta Kendras of Planets:**

The Chesta Kendra is also called Sreegrochcha Kendra. According to Sripathi it is obtained by applying the formula:-

$$\text{Planet's Sreegrochcha} = \frac{(\text{its Mean Long.} + \text{its true long.})}{2}$$

$$= \text{Chesta Kendra}$$

| Planet | Its Seegrochcha |   | $\frac{\text{Its Mean Long} + \text{Its true Long.}}{2}$ | Kendras |
|--------|-----------------|---|--|---------|
| Kuja   | 9°.0            | — | $\frac{234°.83 + 298}{2}$                                | 102.585 |
| Budha  | 163°.0          | — | $\frac{200°.03 + 21}{2}$                                 | 52.485  |
| Guru   | 9°.0            | — | $\frac{79°.99 + 90}{2}$                                  | 284.005 |
| Sukra  | 236°.0          | — | $\frac{292°.17 + 357}{2}$                                | 271.415 |
| Sani   | 9°.0            | — | $\frac{180°.95 + 200}{2}$                                | 178.25  |

**Reduced Chesta Kendra:**

| Planet | Chesta Kendra | 360° - Chesta Kendra<br>(If Chesta Kendra is greater<br>than 180°) | Reduced<br>Chesta<br>Kendra |
|--------|---------------|--|-----------------------------|
| Kuja   | 102.585       | —  | 102.585                     |
| Budha  | 52.485        | —  | 52.485                      |
| Guru   | 284.005       | 360°.0 - 284.585   | 75.995                      |
| Sukra  | 271.415       | 360°.0 - 271.415   | 88.585                      |
| Sani   | 178.525       | --   | 59.508                      |

**Chesta Bala:**

The Chesta Bala is zero when the Chesta Kendra is also zero. When it is 180°.0 the Chesta Bala is 60 Shastiamsas. In intermediate position, the bala is found by proportion with the aid of the formula, Reduced Chesta Kendra ÷ 3 = Chesta Bala.

**Chesta Bala in Sri Ram's horoscope:**

|       |           |        |             |
|-------|-----------|--------|-------------|
| Kuja  | 102.585/3 | 34.195 | Shastiamsas |
| Budha | 52.485/3  | 17.485 | "           |
| Guru  | 75.995/3  | 25.332 | "           |
| Sukra | 88.585/3  | 29.528 | "           |
| Sani  | 178.525/3 | 59.508 | "           |

**Naisargika Bala or Natural Strength:**

This is the natural strength that each planet possesses. The value assigned to each depends upon its luminosity. Ravi, the brightest of all the planets has the greatest naisargika strength while Sani, the darkest has the last naisargika Bala. This strength is fixed and holds good in all nativities. Varahamihira observes thus: "Sakubugusucharagni Vruddhitho Veeryavanthaha" meaning that from Saturn to the Sun (according to the order Saturn, Mars, Mercury, Jupiter, Venus, Moon and Sun) the Naisargika bala gradually increases.

So the Naisargika bala in Sri Rama's horoscope is:

|       |       |             |
|-------|-------|-------------|
| Ravi  | 60    | Shastiamsas |
| Moon  | 51.43 | "           |
| Kuja  | 17.14 | "           |
| Budha | 25.70 | "           |
| Guru  | 34.28 | "           |
| Sukra | 42.85 | "           |
| Sani  | 8.57  | "           |

### **Drik (Dristi) Bala or Aspect Strength:**

Dristi means aspect. All planets powerfully aspect the 180th degree from their positions.

### **Dristi Kendra:**

This is the aspect angle. A planet cannot aspect another planet or Bhava within  $30^\circ$  in front of it and  $60^\circ$  behind it. That is, the aspect proper commences from  $30^\circ$  in front of the planet and it stops short at the 300th degree from the planet. A planet cannot exercise any aspect over another Bhava or planet which is within  $30^\circ$  or beyond  $300^\circ$  from the aspecting planet. Dristi Kendra (Aspect Angle) commences from  $30^\circ$ , gradually increases and at  $60^\circ$  it gets an aspect value of 15 Shastiamsas. The value increases till the Dristi Kendra is  $90^\circ$ . When it is  $90^\circ$ , the Dristi value will be 45 Shastiamsas. Again from  $120^\circ$  to  $150^\circ$  the value falls down and the Dristi value will be nil at  $150^\circ$ . From  $150^\circ$  onwards till  $180^\circ$  there is a sudden jump in the Dristi value and the maximum Dristi of 60 Shastiamsas is attained at  $180^\circ$ . Again the value diminishes gradually till it reaches zero at  $300^\circ$ .

### **Dristi Graha:**

A planet that aspects or in other words, the aspecting body is called the Dristi Graha.

### **Drusya Graha:**

The planet that is aspected is known as Drusya Graha.

**Method of finding Dristi Kendras or Aspect Angle:**

Subtract the longitude of the Drishta Graha (aspecting planet) from that of the Drusya Graha (aspected body). The result represents Dristi Kendra or Aspect Angle.

Rule: Dristi Kendra = Longitude of Drusya Graha - Longitude of Drishta Graha.

**Determination of Dristi Kendra in Sri Rama's Horoscope:**

|       | Ravi | Moon | Kuja | Budha | Guru | Sukra | Sani |
|-------|------|------|------|-------|------|-------|------|
| Ravi  | —    | 279  | 71   | —     | 279  | —     | 169  |
| Moon  | 81   | —    | 152  | 69    | —    | 93    | 250  |
| Kuja  | 289  | 208  | —    | 277   | 208  | —     | 98   |
| Budha | —    | 291  | 83   | —     | 291  | —     | 181  |
| Guru  | 81   | —    | 152  | 69    | —    | 93    | 250  |
| Sukra | —    | 267  | 59   | —     | 267  | —     | 157  |
| Sani  | 191  | 110  | 262  | 179   | 110  | 203   | —    |

**Dristi Value:**

Sripathi says, "Subtract the Dristi from Drushya and if the remainder exceeds 6 signs and is within 10 signs subtract this remainder from 10 signs, convert the remainder into minutes, divide the result by 7200, so that the Dristi value may be obtained."

From the above, we can formulate the following rule and obtain the Dristi values.

*Overjoyed to eat ears of fully ripe paddy and holding them in their beaks, a charming row of cranes takes its flight across the sky with a dashing speed like a knotted garland carried by the wind.*

*- Kishkinda Kanda - Canto 30 - Verse 47*

**Dristi value**  
If the Dristi angle  
is between

Dristi value is equal to

|                                |   |
|--------------------------------|---|
| 6 & 10 signs or<br>180° & 300° | $\frac{300 - \text{Dristi Kendra}}{2}$                |
| 5 & 6 signs or<br>150° & 180°  | $\text{Dristi Kendra} - 150 \times 2$                 |
| 4 & 5 signs or<br>120° & 150°  | $150^\circ - \text{Dristi Kendra}$                    |
| 3 & 4 signs or<br>90° & 120°   | $\frac{120^\circ - \text{Dristi Kendra}}{2} \quad 30$ |
| 2 & 3 signs or<br>60° & 90°    | $\text{Dristi Kendra} - 60^\circ - 15$                |
| 1 & 2 signs or<br>30° & 60°    | $\frac{\text{Dristi Kendra} - 30^\circ}{2}$           |

#### Visesha Dristi:

Some planets have what is called visesha dristi or special aspect in addition to their usual dristi. Sani has dristi in the 3rd (60° – 90°) and 10th (270° – 300°) houses. Guru has visesha dristi in the 5th (120 – 150°) and 9th (240° – 270°) and Kuja has special aspect in the 4th (90° – 120°) and the 8th (210° – 240°). The Visesha dristi value of Kuja is 15 Shastiamsas; that of Guru is 30; and that of Sani is 45 Shastiamsas.

After finding out the ordinary dristi values of all the grahas, the special dristi values must be added to the ordinary ones in the case of Kuja, Guru and Sani, if they have really any special aspect in the horoscope over any other planets.

#### Subha and Papa dristies:

The aspect cast by a benefic planet is Subha dristi (Positive aspect) and may be denoted by a positive sign or with no sign. The aspect cast by a malefic planet is known as Papa dristi (negative aspect) and may be denoted by a negative sign.

**Papa Grahas:**

Papa grahas are malefic planets. They are Ravi, Kuja, Krishna Chandra, Sani and badly associated Budha.

**Subha grahas:**

Subha grahas are the benefic planets. They are Guru, Sukra, Chandra (waxing Moon) and well associated Budha.

**Dristi Pinda:**

The Sum total of the Dristi values of all Drista grahas (aspecting planets) over the Drusya grahas (aspected planets) is called the Dristi Pinda. This is negative or positive according to the dristi of the Papas (malefics) or the Subhas (benefics) being greater.

**Determination of Dristi Pindas in Sri Rama's horoscope:**

|       | Ravi   | Moon  | Kuja  | Budha | Guru  | Sukra | Sani  | Total |
|-------|--------|-------|-------|-------|-------|-------|-------|-------|
| Ravi  | -      | 10.50 | 36.00 | -     | 10.50 | -     | -38   | -43   |
| Moon  | -36    | -     | -4    | -24.0 | -     | -25.0 | -25.0 | -45.5 |
| Kuja  | -5.5   | 46.0  | -     | -11.5 | 46.0  | -     | -41.0 | 34.0  |
| Budha | -      | 4.5   | -38.0 | -     | 4.5   | -     | -59.5 | -87.0 |
| Guru  | -36.0  | -     | -4.0  | -24.0 | -     | 43.5  | -     | -46.0 |
| Sukra |        | 16.50 | -14.5 |       | 46.5  |       |       | 48.5  |
| Sani  | -54.50 | 35.0  | -19.0 | -58.0 | 35.00 | 48.5  | -48.5 | -61.5 |

**Determination of Drik Bala in Sri Rama's horoscope:**

This means aspect strength. The Drik Bala of a planet is one fourth of the Dhrishti Pinda on it. It is positive or negative according as the Dhrishti Pinda is positive or negative.

| Planet | Dhrishti Pinda | Drik Bala |
|--------|----------------|-----------|
| Ravi   | -43.0          | -10.75    |
| Moon   | -45.5          | -11.75    |
| Kuja   | 34.0           | 8.50      |
| Budha  | -87.0          | -21.75    |
| Guru   | -46.0          | -11.50    |
| Sukra  | 48.50          | 12.125    |
| Sani   | -61.5          | -15.375   |



**The Shad Bala Pindas:**

We have determined the various kinds of balas of the planets. When all these balas viz., Sthana, Dik, Kala, Chesta and Naisargika, are added we get the total strength of the Shad Bala Pinda. The graha's Drik Bala must be added to or subtracted from the above according as it is positive or negative.

**Shad Bala in Sri Rama's horoscope:**

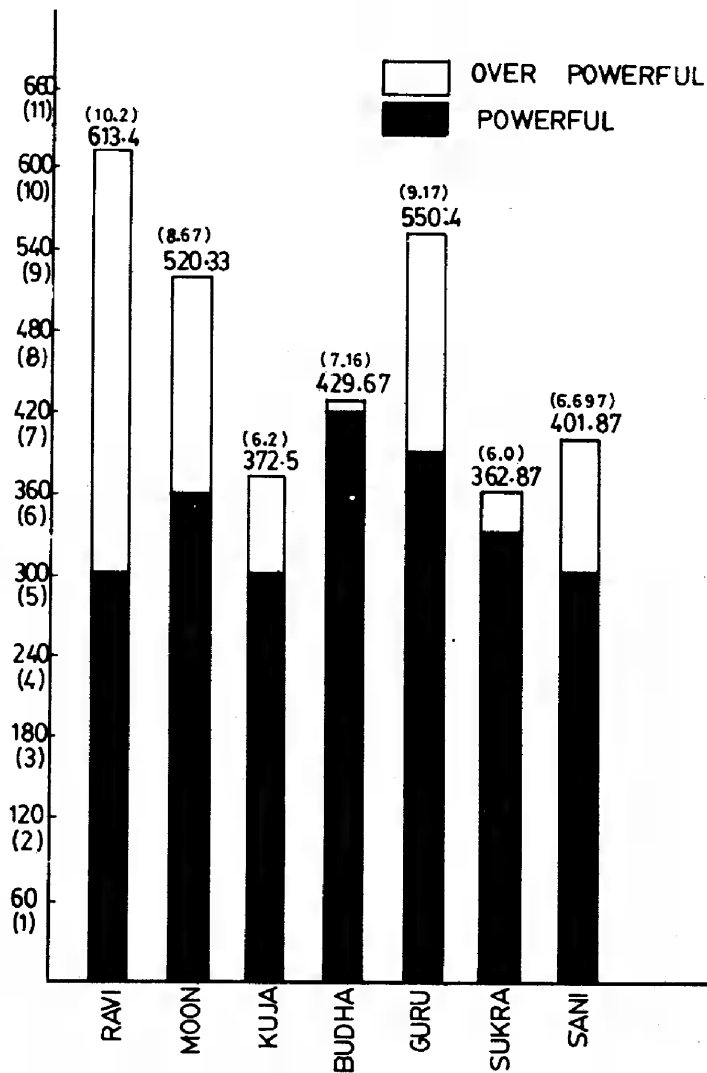
|                          | Ravi    | Moon   | Kuja    | Budha   | Guru    | Sukra   | Sani    |
|--------------------------|---------|--------|---------|---------|---------|---------|---------|
| Sthana                   | 271.875 | 304.75 | 235.00  | 222.00  | 187.375 | 176.25  | 247.5   |
| Dig                      | 58.06   | 91.06  | 38.26   | 33.13   | 56.13   | 2.06    | 32.9    |
| Kala                     | 234.22  | 74.84  | 39.41   | 153.11  | 259.03  | 100.06  | 68.87   |
| Chesta                   | —       | —      | 34.195  | 17.485  | 25.332  | 29.528  | 59.508  |
| Naisar-<br>gika          | 60.0    | 51.43  | 17.14   | 25.7    | 34.28   | 42.85   | 8.57    |
| Drik                     | -10.75  | -1.75  | 8.5     | -21.75  | -11.75  | 12.125  | -15.375 |
| Total<br>Shas-<br>timsas | 613.405 | 520.33 | 372.505 | 429.675 | 550.397 | 362.873 | 401.873 |
| In<br>Rupas              | 10.22   | 8.67   | 6.208   | 7.161   | 9.173   | 6.048   | 6.698   |

*Control of the senses and the mind, forgiveness, righteousness, fortitude, truthfulness, valour and punishing the evil doers are the virtues of kings.*

*Kishkinda Kanda - Canto 17 - Verse 19*

## SHAD BALA IN SHASHTIAMSAS

(In Brackets - Rupas)



**Powerful Planets:**

Ravi is held to be powerful when his Shad Bala is 5 or more Rupas. Chandra becomes strong when his Shad Bala Pinda is 6 or more. Kuja becomes powerful when his Shad Bala Pinda is 5 or more. Budha becomes potent by having Shad Bala Pinda as 7 Rupas. Guru, Sukra and Sani become thoroughly powerful if their Shad Bala Pindas are 6.5, 5.5 and 5 Rupas or more respectively.

**Powerful Planets in Sri Rama's horoscope:**

| Planet | Shad Bala Pinda<br>in Rupas | Powerful<br>Rupa | No. of times<br>Powerful or<br>Powerless |
|--------|-----------------------------|------------------|--|
| Ravi   | 10.22                       | 5                | 2.04                                     |
| Moon   | 8.67                        | 6                | 1.445                                    |
| Kuja   | 6.208                       | 5                | 1.2416                                   |
| Budha  | 7.164                       | 7                | 1.023                                    |
| Guru   | 9.173                       | 6.5              | 1.411                                    |
| Sukra  | 6.048                       | 5.5              | 1.099                                    |
| Sani   | 6.698                       | 5                | 1.339                                    |

In Sri Rama's horoscope all the planets are powerful more than 100%. This signifies the divinity. Ravi is most powerful with more than twice in its powerful Rupas. The order of the strength of the planets is classified below.

| Planet | Most powerful order |
|--------|---------------------|
| Ravi   | I                   |
| Moon   | II                  |
| Guru   | III                 |
| Sani   | IV                  |
| Kuja   | V                   |
| Sukra  | VI                  |
| Budha  | VII                 |

**Bhava Bala or House Strength:**

Bhava Bala is the potency or strength of the house or Bhava or signification. Each of the 12 bhavas comprehend all human events;



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or functions. For instance, the first bhava represents Thanu or body, the appearance of the individual, his complexion, his disposition, his stature, etc. If it attains certain strength, the native will enjoy the indications of the bhava fully otherwise he will not enjoy them sufficiently.

The strength of a bhava is composed of three factors, viz., (1) Bhavadhipathi Bala, (2) Bhava Dig Bala and (3) Bhava Dhristi Bala.

#### Bhavadhipathi Bala:

This is the potency of the lord of the bhava. The lord of a bhava is the planet in whose sign the bhava madhya falls. The Shad Bala Pinda (aggregate of the Shad Balas) of the lord of the bhava constitutes its Bhavadhipathi Bala.

#### Bhavadhipathi Bala in Sri Rama's horoscope:

| Bhava       | Bhava Madya | Sign      | Lord  | Bhavad-hipathi Bala in Rupas |
|-------------|-------------|-----------|-------|------------------------------|
| I Thanus    | 101.6       | Kataka    | Moon  | 8.67                         |
| II Dhana    | 125.2       | Simha     | Ravi  | 10.22                        |
| III Bhrathu | 151.7       | Kanya     | Budha | 7.164                        |
| IV Matru    | 183.2       | Tula      | Sukra | 6.048                        |
| V Putra     | 218.2       | Vrischika | Kuja  | 6.208                        |
| VI Satru    | 253.1       | Dhanus    | Guru  | 9.173                        |
| VII Kalatra | 281.6       | Makara    | Sani  | 6.698                        |
| VIII Ayur   | 305.2       | Kumba     | Sani  | 6.698                        |
| IX Bagya    | 331.7       | Meena     | Guru  | 9.173                        |
| X Karma     | 3.2         | Mesha     | Kuja  | 6.208                        |
| XI Labha    | 38.2        | Vrishaba  | Sukra | 6.048                        |
| XII Vraya   | 73.1        | Mithuna   | Budha | 7.164                        |

**Bhava Dig Bala:**

This is the strength acquired by the different bhavas falling in the different groups of types of signs. The Zodiacal signs are grouped into Nara Rasis (human signs), Jalachara Rasis (aquatic signs), Chathushpada (quadrupedal signs) and Keeta Rasis (insect signs). It is supposed that a particular bhava acquires strength by its mid-point falling in a particular kind of sign. For instance if the mid-point of the fourth house happens to fall in a Jalachara Rasi it gains a strength of a Rupa.

**Nara Rasis:**

Nara Rasis mean human signs. They are Mithuna, Kanya, Tula, first half of Dhanus and Kumbha. If the midpoint of the ascendant happens to fall in any one of these signs, then the ascendant acquires a strength of one Rupa. And conversely, if the midpoint of the seventh house falls in a Nara Rasi, the seventh bhava loses all vitality.

**Jalachara Rasis:**

Watery or aquatic signs are termed as Jalachara Rasis. They are Kataka, second half of Makara and Meena. If the fourth house falls in a Jalachara Rasi, it gets a strength of 60 Shastiamsas. When a sign belonging to this type becomes the Bhava Madhya of the 10th house, it becomes exceedingly powerless.

**Chathushpada Rasis:**

These are the quadrupedal signs, viz., Mesha, Vrishabha, Simha, second half of Dhanus and first half of Makara. When a Chathushpada Rasi becomes the Bhava Madhya of the 10th house, the bhava becomes most powerful and gets 60 Shastiamsas. Conversely, the mid-point of the fourth house in a like sign becomes utterly weak.

**Keeta Rasis:**

These are insect signs. In the whole of the Zodiac, Vrischika is the only Keeta Rasi. Scorpio by its nature is highly mischievous. If a Keeta Rasi happens to be Bhava Madhya of the seventh house, it acquires a potency of 60 Shastiamsas. Likewise, if the Bhava Madhya of the ascendant happens to fall in a Keeta Rasi, it becomes powerless.

**Determination of Bhava Dig Bala:**

The lagna bhava becomes most powerful when it falls in a Nara Rasi, getting a strength of 60 shastiamsas. When a Nara Rasi happens to be Bhava Madhya of the seventh bhava, it becomes powerless and gets zero shastiamsas. The strength decreases gradually from the first Bhava Madhya till it is nil at the seventh Bhava Madhya. Similarly the Bhava Madhya of a Chatushpada Rasi becomes utterly powerless when it happens to be the fourth and reaches its maximum power when it becomes the Bhava Madhya of the tenth. The value of the strength increases from the fourth Bhava Madhya at 10 shastiamsas per sign till it is 60 at the tenth Bhava Madhya. Therefore, first find the number of a given Bhava Madhya and subtract it from 1, if the given Bhava Madhya is situated in the last half of Makara, Katka, Meena or Vrischika. Subtract it from 4, if the given Bhava Madhya is situated in Mesha, Vrishaba, Simha, first half of Makara or last half of Dhanus. Subtract it from 7 if in Mithuna, Tula, Kumbha, Kanya or first half of Dhanus. Lastly from 10 if in Cancer, Meena and last half of Makara. If the difference exceeds 6, subtract it from 12, otherwise take it as it is and multiply this difference by 10. You will then get Bhava Dig Bala of the particular bhava.

**Determination of Bhava Dig Bala in Sri Rama's horoscope:**

| Bhava | Bhava Dig Bala |
|-------|----------------|
| 1 st. | 0              |
| 2nd   | 20             |
| 3rd   | 40             |
| 4th   | 30             |
| 5th   | 50             |
| 6th   | 10             |
| 7th   | 30             |
| 8th   | 10             |
| 9th   | 10             |
| 10th  | 60             |
| 11th  | 50             |
| 12th  | 50             |

Subtract the longitude of the aspecting planet from the aspected Bhava Madhya, adding 360 to this when it is less than the longitude of aspecting planet. The Drishti Kendra is obtained. Get the Dhrishti value by applying to the Drishti Kendra, the principles described in the calculation of DrishtiBala. Add Vishesha Dhrishti, if any, of Kuja, Guru and Sani. Then adopt the Dhrishti values of Guru and Budha on the Bhava Madhya as they are; adopt a fourth of the aspect value of other planets, over the Madhya Bhava. The dhrishti on the Bhava Madhya will be positive or negative according to the Subha Drishti on it being greater or less than Krura Drishti. The drishti is subha (positive) when the aspecting planet is a natural benefic and it is papa when the aspecting planet is natural malefic.

### Determination of Aspect Angle in Sri Rama's horoscope:

| Bhava &<br>its long. | Ravi<br>9° 0 | Moon<br>90° 0 | Kuja<br>298° 0 | Budha<br>21° 0 | Guru<br>90° 0 | Sukra<br>357° 0 | Sani<br>200° 0 |
|----------------------|--------------|---------------|----------------|----------------|---------------|-----------------|----------------|
| o                    | o            | o             | o              | o              | o             | o               | o              |
| 1st 101.6            | 92.6         | —             | 163.6          | —              | —             | 104.6           | 261.6          |
| 2nd 125.2            | 116.2        | —             | 187.2          | 104.2          | —             | 128.2           | 285.2          |
| 3rd 151.7            | 142.7        | —             | <u>213.7</u>   | 130.7          | —             | 154.7           | <u>311.7</u>   |
| 4th 183.2            | 174.2        | 93.2          | 245.2          | 162.2          | 93.2          | 186.2           | —              |
| 5th 218.2            | 219.2        | 128.2         | 280.2          | 197.2          | <u>128.2</u>  | 221.2           | —              |
| 6th 253.1            | 244.1        | 163.1         | 315.1          | 232.1          | 163.1         | 256.1           | —              |
| 7th 281.6            | 272.6        | 191.6         | —              | 260.6          | 191.6         | 284.6           | 81.6           |
| 8th 305.2            | 296.2        | 215.2         | —              | 284.2          | 215.2         | 308.2           | 105.2          |
| 9th 331.7            | 322.7        | 241.7         | —              | 310.7          | 241.7         | —               | 131.7          |
| 10th 3.2             | —            | 273.2         | 65.2           | —              | 273.2         | —               | <u>163.2</u>   |
| 11th 38.2            | —            | 308.2         | 100.2          | —              | 308.2         | —               | 198.2          |
| 12th 73.1            | 64.1         | —             | 135.1          | —              | —             | 76.1            | 233.1          |

Note: Figures underlined indicate visesha drishti.



| Bhava | Ravi               | Moon               | Kuja               | Budha  | Guru   | Sukra              | Sani               | Bhava<br>Drig<br>Bhala |
|-------|--------------------|--------------------|--------------------|--------|--------|--------------------|--------------------|------------------------|
|       | $\frac{1}{4}$<br>— | $\frac{1}{4}$<br>+ | $\frac{1}{4}$<br>— | 1<br>— | 1<br>+ | $\frac{1}{4}$<br>+ | $\frac{1}{4}$<br>— |                        |
| 1st   | 10.92              | —                  | 6.6                | —      | —      | 9.42               | 4.8                | -12.9                  |
| 2nd   | 11.725             | —                  | 14.1               | 37.9   | —      | 5.45               | 1.85               | -60.12                 |
| 3rd   | 1.82               | —                  | 10.79              | 19.3   | —      | 2.35               | —                  | -29.56                 |
| 4th   | 12.1               | 10.85              | 6.85               | 24.4   | 43.4   | 14.22              | —                  | 25.12                  |
| 5th   | 11.35              | 5.45               | 2.47               | 51.4   | 21.8   | 9.85               | —                  | -28.12                 |
| 6th   | 6.99               | 6.55               | —                  | 33.95  | 26.2   | 5.49               | —                  | -2.7                   |
| 7th   | 3.42               | 13.55              | —                  | 19.7   | 54.2   | 1.92               | —                  | 46.55                  |
| 8th   | 0.48               | 10.6               | —                  | 7.9    | 42.4   | —                  | 9.15               | 35.48                  |
| 9th   | —                  | 7.29               | —                  | —      | 29.15  | —                  | 4.58               | 31.86                  |
| 10th  | —                  | 3.35               | 5.05               | —      | 13.4   | —                  | 6.6                | 5.1                    |
| 11th  | —                  | —                  | 9.98               | —      | —      | —                  | 12.73              | -22.7                  |
| 12th  | 4.78               | —                  | 3.73               | —      | —      | 7.78               | 8.36               | -9.08                  |

Note: — Sign before figures indicates negative sign.

**Total Bhava Bala:**

Add together, the Bhavadhipathi Bala, Bhava Dig Bala and Bhava Drig Bala of each Bhava. The sum total represents the strength of the Bhava.

**Total Balas of the twelve Bhavas in Sri Rama's horoscope:**

| Bhava  | Bhavadhi-<br>pathi Bala | Bhava<br>Dig Bala | Bhava Drig<br>Bala | Total<br>Bhava | in<br>Rupas | Order |
|--|-------------------------|-------------------|--------------------|----------------|-------------|-------|
| 1st  | 520.33                  | 0                 | - 12.9             | 507.43         | 8.46        | IV    |
| 2nd  | 613.425                 | 20                | - 60.125           | 573.28         | 9.55        | II    |
| 3rd  | 429.675                 | 40                | - 29.562           | 440.113        | 7.34        | VII   |
| 4th  | 362.873                 | 30                | 25.125             | 417.998        | 6.97        | X     |
| 5th  | 372.505                 | 50                | - 28.125           | 394.387        | 6.57        | XI    |
| 6th  | 552.392                 | 10                | - 2.7              | 557.697        | 9.29        | III   |
| 7th  | 401.873                 | 30                | 46.55              | 478.423        | 7.97        | V     |
| 8th  | 404.873                 | 10                | 35.475             | 450.348        | 7.5         | VIII  |
| 9th  | 550.397                 | 10                | 31.862             | 592.259        | 9.87        | I     |
| 10th   | 372.505                 | 60                | 5.1                | 437.605        | 7.29        | IX    |
| 11th   | 362.873                 | 50                | - 22.7             | 390.173        | 6.5         | XII   |
| 12th   | 429.675                 | 50                | - 9.087            | 470.588        | 7.84        | VI    |
| Note: - sign before figures indicate negative value. |                         |                   |                    |                |             |       |

**ISHTA AND KASHTA PHALAS:****General Observations:**

Parasara, Sripathi, Kesava and other writers enable us to measure numerically the extent of good and bad results that would accrue in a particular Dasa. The occupations which natives have to pursue under certain planetary conditions, the effects due to the different bhavas, yogas, aspects and other indications of planets should be assigned suitably according to the strength of planets ruling the Dasas and Bhukthis. In the matter of forming a general opinion regarding the extent of good and evil that is likely to happen during a particular Dasa or a Bhukthi, the Ishta (good) and Kashta (bad) Phalas of the respective lords would be immensely helpful.

**Sun's Chesta Kendra:**

Ravi has no Chesta Kendra or Chesta Bala as he never gets into retrogression. But still a method is prescribed to find his Chesta Bala which is necessary to ascertain the Ishta and Kashta Phalas.

Add  $90^{\circ}.0$  to Sun's sayana longitude. The result is Chesta Kendra; dividing this by 3 we get his Chesta Bala.

**Sun's Chesta Bala in Sri Rama's horoscope:**

|                           |                   |
|---------------------------|-------------------|
| Nirayana longitude of Sun | $9^{\circ}.0$     |
| Less Ayanamsa             | $19^{\circ}.965$  |
| Sayna longitude of Sun    | $349^{\circ}.035$ |

Since Sun's Chesta Kendra exceeds  $180^{\circ}.0$ , **subtract** from  $360^{\circ}.0$ .

$$360^{\circ}.0 - 349.035 = 10^{\circ}.965$$

$$\text{Sun's Chesta Bala} = 10^{\circ}.965/3 = 3.655 \text{ Shasti amsas.}$$

**Chesta Bala of Moon:**

Subtract the Sun's longitude from that of the Moon and the latter's Chesta Kendra is obtained. If the remainder exceeds  $180^{\circ}.0$ , subtract it from  $360^{\circ}$  and divide the result by 3 to get the Chesta Bala.

**Moon's Chesta Bala in Sri Rama's horoscope:**

|  |                |
|--|----------------|
| Moon's longitude                       | $90^{\circ}.0$ |
| Sun's longitude                        | $9^{\circ}.0$  |
| Moon's Chesta Kendra                   | $81^{\circ}.0$ |
| Dividing by 3, we get 27 Shasti amsas. |                |

**Determination of Ishta Phala:**

The Ishta portion of a planet's influence is obtained thus:

The Ochcha Bala (exaltation strength) of a planet is multiplied by its Chesta Bala and the square root of the product extracted. The result would represent the Ishta Phala.

**Ishta Bhala of planets in Sri Rama's horoscope:**

|        |                           |                       |
|--------|---------------------------|-----------------------|
| Sun;   | $\sqrt{60 \times 3.655}$  | = 14.81 Shasti amsas. |
| Moon;  | $\sqrt{41 \times 27}$     | = 33.27 " "           |
| Kuja;  | $\sqrt{60 \times 34.195}$ | = 45.29 " "           |
| Budha; | $\sqrt{12 \times 17.485}$ | = 14.49 " "           |
| Guru;  | $\sqrt{58 \times 25.332}$ | = 38.33 " "           |
| Sukra; | $\sqrt{60 \times 29.528}$ | = 42.09 " "           |
| Sani;  | $\sqrt{60 \times 59.508}$ | = 59.75 " "           |

**Determination of Kashta Bhala:**

The square root of the product of 60 minus ochcha bala and 60 minus Chesta bala gives the amount of Kashta influence in Shasti amsas.

**Determination of Kashta Bhala in Sri Rama's horoscope:**

Kashta Bhala = (60 - Occha Bala) (60 - Chesta Bala)

|        |                                  |         |
|--------|----------------------------------|---------|
| Sun;   | $\sqrt{(60 - 60) (60 - 3.655)}$  | = 0     |
| Moon;  | $\sqrt{(60 - 41) (60 - 27)}$     | = 25.04 |
| Kuja;  | $\sqrt{(60 - 60) (60 - 34.195)}$ | = 0     |
| Budha; | $\sqrt{(60 - 12) (60 - 17.485)}$ | = 45.17 |
| Guru;  | $\sqrt{(60 - 58) (60 - 25.332)}$ | = 8.33  |
| Sukra; | $\sqrt{(60 - 60) (60 - 29.528)}$ | = 0     |
| Sani;  | $\sqrt{(60 - 60) (60 - 59.508)}$ | = 0     |



*In a land destitute of a ruler the thundering cloud  
wreathed with lightning does not drench the earth with  
rain water.*

*Ayodhya Kanda - Canto 67 - Verse 9*

## CHAPTER VIII

### ASHTAKAVARGA

In Hindu astrology, Gochara system plays a unique roll. In Valmiki Ramayana there are references about the effects produced by the planets during their transits in the various houses. Thus since the age of Rama this system is being practised by the Hindu astrologers to compute the strength of the planets during transit, assess the timings of events, predict the future happenings etc. In this system, the house of the Moon is taken as the first house. The transits are based on the Nirayana chart. Left to individuals different interpretations and timing of events may occur , however well versed and experienced they may be in the art of prediction. So this system is recommended since it prescribes certain numerically measured units for uniform application by all who predict by the Gochara system. The strength of a planet during its transit is assessed by the bindus it gets. Generally, a planet is said to be benefic, if it gets over five bindus in his own ashtakavarga house etc. If it gets less than four, it is generally considered as unfavourable. The maximum that could be secured by a planet is 8 bindus. Sri Rama 's horoscope has been cast almost exhaustively earlier. The author takes this as standard horoscope and has worked out the bindus secured by different planets in various houses, charted and sorted them out and processed them to assess the strength for the required purposes, predictions etc. This enables the reader to study them in detail, verify the results and judge for himself how correct the happenings were as per the diary of Sri Rama in Chapter X of this book.

### Ashtakavarga Charts - Individual or Binnaashtaka Varga:

The following Table gives the positions of Sun and the other planets up to Sani which are favourable from themselves and Lagna, to occupy since they vary their places due to their continuous motions.

|       | Ravi<br>48                | Moon<br>49                | Kuja<br>39             | Budha<br>54               | Guru<br>56                     | Sukra<br>52                     | Sani<br>39            |
|-------|---------------------------|---------------------------|------------------------|---------------------------|--------------------------------|---------------------------------|-----------------------|
| Sun   | 1,2,4,7,<br>8,9,10,<br>11 | 3,6,7,<br>10,11<br>11     | 3,5,6<br>10,11         | 5,6,9<br>11,12            | 1,2,3,<br>4,7,8<br>9,10,<br>11 | 8,11,<br>12<br>11               | 1,2,4,<br>7,8,10,     |
| Moon  | 3,6,10,<br>11             | 1,3,6,<br>7,10<br>11      | 3,6,11                 | 2,4,6,<br>8,10,<br>11     | 2,5,7,<br>9,11                 | 1,2,3,<br>4,5,8,<br>9,11,<br>12 | 3,6,11                |
| Kuja  | 1,2,4<br>7,8,9,<br>10,11  | 2,3,5,<br>6,9,10<br>11    | 1,2,4,<br>7,8,10<br>11 | 1,2,4<br>7,8,9<br>10,11   | 1,2,4,<br>7,8,<br>10,11        | 3,5,6,<br>9,11,<br>12           | 3,5,6,<br>10,11<br>12 |
| Budha | 3,5,6,<br>9,10,<br>11,12  | 1,3,4,<br>5,7,8,<br>10,11 | 3,5,6,<br>11           | 1,3,5,<br>6,9,<br>10,11   | 1,2,4,<br>5,6,9,<br>10,11      | 3,5,6,<br>9,11                  | 6,8,9,<br>10,11<br>12 |
| Guru  | 5,6,9,<br>11              | 1,4,7,<br>8,10,<br>11,12  | 6,10,<br>11,12         | 6,8,11<br>12              | 1,2,3,<br>4,7,8,<br>10,11      | 5,8,9,<br>10,11                 | 5,6,11<br>12          |
| Sukra | 6,7,12                    | 3,4,5<br>7,9,<br>10,11    | 6,8<br>11,12           | 1,2,3,<br>4,5,8,<br>9,11  | 2,5,6,<br>9,10<br>11           | 1,2,3,<br>4,5,8,<br>9,10<br>11  | 6,11<br>12            |
| Sani  | 1,2,4,7,8,<br>9,10,11     | 3,5,6,<br>11              | 1,4,7,<br>8,9,10<br>11 | 1,2,4,<br>7,8,9,<br>10,11 | 3,5,6,<br>12                   | 3,4,5,<br>8,9,11                | 3,5,6,<br>11          |
| Lagna | 3,4,6,<br>10,11,12        | 3,6,<br>10,11             | 1,3,6,<br>10,11        | 1,2,4,<br>6,8,<br>10,11   | 1,2,4,<br>5,6,7<br>9,10,<br>11 | 1,2,3,<br>4,5,8<br>9,11         | 1,3,4,<br>6,10<br>11  |

|   |   |   |   |
|---|---|---|---|
|   | Sun<br>0                                      | 0 |   |
| 0 | Chart 1<br>Sun's<br>Ashtavarga<br>from<br>Sun |   | 0 |
| 0 |   |   |   |
| 0 | 0   | 0 |   |

|   |  |   |      |
|---|--|---|------|
|   | 0  | 0 |      |
|   | Chart 2<br>Sun's<br>Ashtavarga<br>from<br>Moon |   | Moon |
|   |  |   |      |
| 0 |  |   | 0    |

|           |  |   |   |
|-----------|--|---|---|
|           | 0  |   |   |
| 0         | Chart 3<br>Sun's<br>Ashtavarga<br>from<br>Kuja |   | 0 |
| Kuja<br>0 |  |   | 0 |
|           | 0  | 0 | 0 |

|   |   |  |   |
|---|---|--|---|
| 0 | Budha   |  | 0 |
| 0 | Chart 4<br>Sun's<br>Ashtavarga<br>from<br>Budha |  |   |
| 0 |   |  | 0 |
| 0 |   |  | 0 |

|   |  |   |      |
|---|--|---|------|
| 0 |  | 0 |      |
|   | Chart 5<br>Sun's<br>Ashtavarga<br>from<br>Guru |   | Guru |
|   |  |   |      |
| 0 | 0  |   |      |

|       |   |  |   |
|-------|---|--|---|
| Sukra |   |  |   |
| 0     | Chart 6<br>Sun's<br>Ashtavarga<br>from<br>Sukra |  |   |
|       |   |  | 0 |
|       |   |  | 0 |

|   |  |   |   |
|---|--|---|---|
|   | 0  | 0 | 0 |
|   | Chart 7<br>Sun's<br>Ashtavarga<br>from<br>Sani |   | 0 |
| 0 |  |   | 0 |
|   | 0  | 0 |   |

|   |   |   |       |
|---|---|---|-------|
|   | 0   | 0 | 0     |
|   | Chart 8<br>Sun's<br>Ashtavarga<br>from<br>Lagna |   | Lagna |
|   |   |   |       |
| 0 |   | 0 | 0     |

## SARVASHTAKAVARGA

|   |                              |   |   |
|---|------------------------------|---|---|
| 2 | 5                            | 5 | 3 |
| 4 | Sun's<br>Ashtakavarga-<br>48 |   | 3 |
| 4 |                              |   | 4 |
| 5 | 4                            | 4 | 5 |

|   |                               |   |   |
|---|-------------------------------|---|---|
| 1 | 5                             | 5 | 4 |
| 5 | Moon's<br>Ashtakavarga-<br>49 |   | 4 |
| 6 |                               |   | 3 |
| 4 | 3                             | 4 | 5 |

|   |                             |   |   |
|---|-----------------------------|---|---|
| — | 4                           | 5 | 3 |
| 3 | Mars<br>Ashtakavarga-<br>39 |   | 4 |
| 5 |                             |   | 5 |
| 3 | 1                           | 3 | 3 |

|   |                                |   |   |
|---|--------------------------------|---|---|
| 3 | 6                              | 5 | 5 |
| 6 | Budha's<br>Ashtakavarga-<br>54 |   | 4 |
| 4 |                                |   | 5 |
| 5 | 3                              | 5 | 3 |



|   |                               |   |   |
|---|-------------------------------|---|---|
| 3 | 6                             | 5 | 1 |
| 5 | Guru's<br>Ashtakavarga-<br>56 |   | 6 |
| 7 |                               |   | 6 |
| 5 | 5                             | 4 | 3 |

|   |                                |   |   |
|---|--------------------------------|---|---|
| 6 | 2                              | 6 | 5 |
| 6 | Sukra's<br>Ashtakavarga-<br>52 |   | 4 |
| 2 |                                |   | 4 |
| 4 | 6                              | 3 | 4 |

|   |                               |   |   |
|---|-------------------------------|---|---|
| 3 | 2                             | 5 | 2 |
| 4 | Sani's<br>Ashtakavarga-<br>39 |   | 2 |
| 3 |                               |   | 2 |
| 6 | 4                             | 3 | 3 |

|    |                               |    |    |
|----|-------------------------------|----|----|
| 18 | 30                            | 36 | 23 |
| 33 | Sarva<br>Ashtakavarga-<br>337 |    | 27 |
| 31 |                               |    | 29 |
| 32 | 26                            | 26 | 26 |

### TRIKONA REDUCTION

|   |   |   |   |
|---|---|---|---|
| 0 | 1   | 2 | 0 |
| 4 | Guru's<br>Ashtakavarga-<br>After<br>I Reduction |   | 3 |
| 4 |   |   | 1 |
| 0 | 2   | 3 | 0 |

|   |  |   |   |
|---|--|---|---|
| 2 | 0  | 4 | 2 |
| 3 | Sukra's<br>Ashtakavarga-<br>After<br>I Reduction |   | 0 |
| 0 |  |   | 2 |
| 2 | 2  | 0 | 2 |

|   |   |   |   |
|---|---|---|---|
| 1 | 0   | 2 | 0 |
| 2 | Sani's<br>Ashtakavarga-<br>After<br>I Reduction |   | 0 |
| 0 |   |   | 0 |
| 4 | 2   | 1 | 0 |

## EKATIPATYA OR REDUCTION II

|   |      |   |   |
|---|------|---|---|
| 0 | 1    | 0 | 0 |
| 0 | RAVI |   | 0 |
| 0 |      |   | 0 |
| 0 | 1    | 1 | 0 |

|   |         |   |   |
|---|---------|---|---|
| 0 | 2       | 0 | 0 |
| 0 | CHANDRA |   | 3 |
| 1 |         |   | 0 |
| 0 | 0       | 0 | 0 |

|   |      |   |   |
|---|------|---|---|
| 0 | 1    | 0 | 0 |
| 0 | KUJA |   | 4 |
| 2 |      |   | 2 |
| 0 | 0    | 0 | 0 |

|   |       |   |   |
|---|-------|---|---|
| 0 | 1     | 0 | 0 |
| 0 | BUDHA |   | 1 |
| 1 |       |   | 0 |
| 0 | 0     | 0 | 0 |

## EKATHIPATYA OR REDUCTION II

|   |      |   |   |
|---|------|---|---|
| 0 | 1    | 0 | 0 |
| 0 | GURU |   | 3 |
| 4 |      |   | 1 |
| 0 | 1    | 3 | 0 |

|   |       |   |   |
|---|-------|---|---|
| 2 | 0     | 0 | 0 |
| 0 | SUKRA |   | 0 |
| 0 |       |   | 2 |
| 0 | 0     | 0 | 0 |

|   |      |   |   |
|---|------|---|---|
| 1 | 0    | 1 | 0 |
| 0 | SANI |   | 0 |
| 0 |      |   | 0 |
| 1 | 0    | 1 | 0 |

**According to the degree of virtue and sin practised in one's past life one rules over the world, another simply supports one's race; a third actually sinks into hell, and yet another is respected in heaven.**

**Valmiki Ramayana Ayodhya Kanda  
- Canto 109 - Verse 15**

## RESULTS OF REDUCTIONS I &amp; II

B-Before Reduction

A-After Reduction

|                | Ravi |   | Moon |   | Kuja |   | Budha |   | Guru |   | Sukra |   | Sani |    | Total |   |
|----------------|------|---|------|---|------|---|-------|---|------|---|-------|---|------|----|-------|---|
|                | B    | A | B    | A | B    | A | B     | A | B    | A | B     | A | B    | A  | B     | A |
| Mesha          | 1    | 1 | 2    | 2 | 1    | 1 | 1     | 1 | 1    | 0 | 0     | 0 | 0    | 6  | 6     |   |
| Rishaba        | 1    | 0 | 0    | 0 | 2    | 0 | 2     | 0 | 2    | 0 | 4     | 0 | 2    | 13 | 1     |   |
| Mithuna        | 0    | 0 | 0    | 0 | 0    | 0 | 0     | 0 | 0    | 2 | 0     | 0 | 0    | 2  | 0     |   |
| Kataka         | 1    | 0 | 3    | 3 | 4    | 4 | 1     | 1 | 3    | 3 | 0     | 0 | 0    | 12 | 11    |   |
| Simha          | 0    | 0 | 0    | 0 | 2    | 2 | 0     | 0 | 1    | 1 | 2     | 2 | 0    | 5  | 5     |   |
| Kanya          | 1    | 0 | 0    | 0 | 0    | 0 | 0     | 0 | 0    | 2 | 0     | 0 | 0    | 3  | 1     |   |
| Thula          | 1    | 1 | 0    | 0 | 0    | 0 | 0     | 3 | 3    | 0 | 0     | 1 | 1    | 5  | 5     |   |
| Vrischi-<br>Ka | 2    | 0 | 2    | 0 | 1    | 0 | 0     | 0 | 2    | 1 | 2     | 0 | 2    | 10 | 1     |   |
| Dhanus         | 1    | 0 | 1    | 0 | 0    | 0 | 0     | 0 | 0    | 2 | 0     | 4 | 1    | 8  | 1     |   |
| Makara         | 0    | 0 | 1    | 1 | 2    | 2 | 1     | 1 | 4    | 4 | 0     | 0 | 0    | 8  | 8     |   |
| Kumba          | 1    | 0 | 1    | 0 | 0    | 0 | 1     | 0 | 4    | 0 | 3     | 0 | 2    | 12 | 0     |   |
| Meena          | 0    | 0 | 0    | 0 | 0    | 0 | 0     | 0 | 0    | 2 | 2     | 1 | 1    | 3  | 3     |   |

## MANDALA SODANA

|   |                                    |   |   |
|---|------------------------------------|---|---|
| 6 | 6                                  | 0 | 0 |
| 9 | Corrected<br>Sarva<br>Ashtakavarga |   | 3 |
| 7 |                                    |   | 5 |
| 8 | 2                                  | 2 | 2 |

|   |   |   |   |
|---|---|---|---|
| 4 | 1   | 0 | 7 |
| 7 | Sarva<br>Ashtakavarga<br>After<br>I Reduction |   | 1 |
| 7 |   |   | 0 |
| 3 | 0   | 0 | 2 |

|   |   |   |   |
|---|---|---|---|
| 4 | 1   | 0 | 2 |
| 0 | Sarva<br>Ashtakavarga-<br>After<br>II Reduction |   | 1 |
| 7 |   |   | 0 |
| 0 | 0   | 0 | 2 |

|    |                                    |    |    |
|----|------------------------------------|----|----|
| 38 | 26                                 | 20 | 33 |
| 23 | Sarva<br>Ashtakavarga-<br>(Rekhas) |    | 29 |
| 25 |                                    |    | 27 |
| 24 | 30                                 | 30 | 30 |

|    |   |   |   |
|----|---|---|---|
| 2  | 2   | 8 | 9 |
| 11 | Corrected<br>Sarva<br>Ashtakavarga-<br>(Rekhas) |   | 5 |
| 1  |   |   | 3 |
| 0  | 6   | 6 | 6 |

|   |                                |   |   |
|---|--------------------------------|---|---|
| 0 | 2                              | 7 | 3 |
| 5 | Rekhas<br>After<br>I Reduction |   | 4 |
| 0 |                                |   | 1 |
| 0 | 4                              | 0 | 5 |

|   |                                 |   |   |
|---|---------------------------------|---|---|
| 0 | 2                               | 0 | 3 |
| 0 | Rekhas<br>After<br>II Reduction |   | 4 |
| 0 |                                 |   | 3 |
| 0 | 2                               | 0 | 3 |

## RAVI'S PARASTHARASHTAKAVARGA

|       | Mesha         | Rishaba | Mithuna | Kataka                | Simha | Kanya | Thula | Vrishika | Dhanus | Makara | Kumba | Meena | Total |
|-------|---------------|---------|---------|-----------------------|-------|-------|-------|----------|--------|--------|-------|-------|-------|
|       | Ravi<br>Budha |         |         | Lagna<br>Moon<br>Guru |       |       | Sani  |          |        | Kuja   |       | Sukra |       |
| Sani  | 0             | 0       | 0       | 0                     | 0     |       | 0     | 0        |        | 0      |       |       | 8     |
| Guru  |               | 0       |         |                       |       |       | 0     | 0        | 0      |        |       | 0     | 4     |
| Kuja  | 0             |         |         | 0                     | 0     | 0     | 0     | 0        |        | 0      | 0     |       | 8     |
| Surya | 0             | 0       |         | 0                     |       |       | 0     | 0        |        | 0      | 0     |       | 7     |
| Sukra |               |         | 0       |                       | 0     | 0     |       |          | 0      |        | 0     |       | 4     |
| Budha |               |         | 0       |                       | 0     | 0     |       |          | 0      | 0      | 0     | 0     | 7     |
| Moon  | 0             | 0       |         |                       |       | 0     |       |          | 0      |        |       |       | 4     |
| Lagna | 0             | 0       | 0       |                       |       | 0     | 0     | 0        |        |        |       |       | 6     |
| Total | 5             | 5       | 3       | 3                     | 4     | 5     | 4     | 4        | 5      | 4      | 4     | 2     | 48    |

*Sins perpetrated by blundering men were like-wise punished by other rulers of the earth too. Besides this, people undergo expiation themselves and through such expiation that sin which is expiated gets neutralized.*

*- Kishkinda Kanda - Canto 18 - Verse 34*

## MOON'S PARASTHARASTAKAVARGA

|       | Kataka                | Simha | Kanya | Tula | Vrishchika | Dhanus | Makara | Kumba | Meena | Mesha | Rishaba       | Mithuna | Total |
|-------|-----------------------|-------|-------|------|------------|--------|--------|-------|-------|-------|---------------|---------|-------|
|       | Lagna<br>Moon<br>Guru |       |       | Sani |            |        | Kuja   |       |       | Sukra | Ravi<br>Budha |         |       |
| Sani  |                       | 0     |       |      | 0          |        |        | 0     | 0     |       |               |         | 4     |
| Guru  | 0                     |       |       | 0    | 0          |        | 0      | 0     |       | 0     | 0             | 0       | 8     |
| Kuja  |                       | 0     | 0     | 0    |            |        | 0      | 0     |       | 0     | 0             |         | 7     |
| Ravi  |                       |       | 0     | 0    | 0          |        | 0      | 0     |       |       |               | 0       | 6     |
| Sukra | 0                     |       | 0     |      | 0          |        | 0      |       |       |       | 0             | 0       | 6     |
| Budha | 0                     | 0     |       | 0    | 0          |        | 0      | 0     |       | 0     |               | 0       | 8     |
| Moon  | 0                     |       | 0     |      |            | 0      | 0      |       |       | 0     | 0             |         | 6     |
| Lagna |                       |       | 0     |      |            | 0      |        |       |       | 0     | 0             |         | 4     |
| Total | 4                     | 3     | 5     | 4    | 3          | 4      | 6      | 4     | 1     | 5     | 5             | 4       | 49    |

*Men who habing perpetrated sins, have been subjected to punishment by kings, become stainless and ascend to heaven like those who have performed meritorious deeds.*

*- Kishkinda Kanda - Canto 18 - Verse 31*

## KUJA'S PARASTHARASHTAKAVARGA

|       | Makara | Kumba | Meena | Mesha | Rishaba | Mithuna |                       | Simha | Kanya | Tula | Vrishchika | Dhanus | Total |
|-------|--------|-------|-------|-------|---------|---------|-----------------------|-------|-------|------|------------|--------|-------|
|       | Kuja   |       | Sukra | Budha |         |         | Lagna<br>Moon<br>Guru |       |       |      |            |        |       |
| Sani  | 0      |       |       | 0     | 0       | 0       | 0                     | 0     |       | 0    |            |        | 7     |
| Guru  |        |       |       | 0     | 0       | 0       |                       |       |       |      |            | 0      | 4     |
| Kuja  | 0      | 0     |       | 0     |         |         | 0                     | 0     |       | 0    | 0          |        | 7     |
| Ravi  | 0      | 0     |       |       |         |         |                       | 0     | 0     |      |            |        | 4     |
| Sukra | 0      | 0     |       |       |         |         |                       | 0     |       | 0    |            |        | 4     |
| Budha | 0      |       |       |       | 0       |         | 0                     | 0     |       |      |            |        | 4     |
| Moon  |        |       |       |       | 0       | 0       |                       |       | 0     |      |            | 0      | 4     |
| Lagna |        |       |       | 0     | 0       |         | 0                     |       | 0     |      |            | 0      | 5     |
| Total | 5      | 3     | —     | 4     | 5       | 3       | 4                     | 5     | 3     | 3    | 1          | 3      | 37    |

*A thief, in particular and a sinner in general, gets fully absolved from sin either through punishment or by being let go free by way of mercy. A king, not punishing a sinner, however, incurs his sin.*

*- Kishkinda Kanda - Canto 18 - Verse 32*



## BUDHA'S PARASTHARASHTAKAVARGA

|       | Mesha         | Vrishchika | Mithuna | Kataka                | Simha | Kanya | Tula | Vrishchika | Dhanus | Makara | Kumba | Meena | Total |
|-------|---------------|------------|---------|-----------------------|-------|-------|------|------------|--------|--------|-------|-------|-------|
|       | Ravi<br>Budha |            |         | Lagna<br>Moon<br>Guru |       |       | Sani |            |        | Kuja   |       | Sukra |       |
| Sani  | 0             | 0          | 0       | 0                     | 0     |       | 6    | 0          |        | 0      |       |       | 8     |
| Guru  |               | 0          | 0       |                       |       |       |      |            | 0      |        | 0     |       | 4     |
| Kuja  | 0             |            |         | 0                     | 0     | 0     | 0    | 0          |        | 0      | 0     |       | 8     |
| Ravi  |               |            | 0       |                       |       | 0     |      |            | 0      |        | 0     | 0     | 5     |
| Sukra | 0             | 0          | 0       | 0                     |       |       | 0    | 0          |        | 0      |       | 0     | 8     |
| Budha | 0             |            | 0       |                       | 0     | 0     |      |            | 0      | 0      | 0     | 0     | 8     |
| Moon  | 0             | 0          |         |                       | 0     |       | 0    |            | 0      |        | 0     |       | 6     |
| Lagna | 0             | 0          |         | 0                     | 0     |       | 0    |            | 0      |        | 0     |       | 7     |
| Total | 6             | 5          | 5       | 4                     | 5     | 3     | 5    | 3          | 5      | 4      | 6     | 3     | 54    |

**A man who has transgressed the bounds of propriety and is characterised a sinful conduct and who is wedded to a moral philosophy different from the established ethical doctrines does not get recognition among the wise.**

**Valmiki Ramayana - Canto 109 - Verse 3.**

## GURU'S PARASTHARASHTAKAVARGA

|       | Kataka                | Simha | Kanya | Tula | Vrishchika | Dhanus | Makara | Kumba | Meena | Mesha         | Rishaba | Mithuna | Total |
|-------|-----------------------|-------|-------|------|------------|--------|--------|-------|-------|---------------|---------|---------|-------|
|       | Lagna<br>Moon<br>Guru |       |       | Sani |            |        | Kuja   |       | Sukra | Ravi<br>Budha |         |         |       |
| Sani  |                       |       | 0     |      |            | 0      |        | 0     | 0     |               |         |         | 4     |
| Guru  | 0                     | 0     | 0     | 0    |            |        | 0      | 0     |       | 0             | 0       |         | 8     |
| Kuja  | 0                     | 0     |       | 0    | 0          |        | 0      | 0     |       | 0             |         |         | 7     |
| Ravi  | 0                     |       |       | 0    | 0          | 0      | 0      | 0     |       | 0             | 0       | 0       | 9     |
| Sukra | 0                     | 0     |       | 0    | 0          | 0      |        |       |       | 0             |         |         | 6     |
| Budha | 0                     | 0     | 0     |      |            | 0      | 0      | 0     |       | 0             | 0       |         | 8     |
| Moon  |                       | 0     |       |      | 0          |        | 0      |       | 0     |               | 0       |         | 5     |
| Lagna | 0                     | 0     |       | 0    | 0          | 0      | 0      |       | 0     | 0             | 0       |         | 9     |
| Total | 6                     | 6     | 3     | 4    | 5          | 5      | 7      | 5     | 3     | 6             | 5       | 1       | 56    |

*In a rulerless land handfuls of seeds are no longer scattered for fear of uncertainty of crops. Nay. In a rulerless land a son is not amenable to the control of his father nor is a wife amenable to the control of her husband.*

*Valmiki Ramayana - Kalyana Kalpataru*

## SUKRA'S PARASTHARASHTAKAVARGA

|       | Meena | Mesha         | Rahaba | Mithuna | Kataka                | Simha | Kanya | Tula | Vrishchika | Dhanus | Makara | Kumba | Total |
|-------|-------|---------------|--------|---------|-----------------------|-------|-------|------|------------|--------|--------|-------|-------|
|       | Sukra | Ravi<br>Budha |        |         | Lagna<br>Moon<br>Guru |       |       | Sani |            |        | Kuja   |       |       |
| Sani  |       |               | 0      | 0       | 0                     | 0     |       |      |            | 0      | 0      | 0     | 7     |
| Guru  | 0     | 0             | 0      |         |                       |       |       |      | 0          |        |        | 0     | 5     |
| Kuja  | 0     |               | 0      | 0       |                       |       | 0     |      | 0          | 0      |        |       | 6     |
| Ravi  | 0     |               |        |         |                       |       |       |      | 0          |        |        | 0     | 3     |
| Sukra | 0     | 0             | 0      | 0       | 0                     |       |       | 0    | 0          | 0      | 0      |       | 9     |
| Budha |       |               |        | 0       |                       | 0     | 0     |      |            | 0      |        | 0     | 5     |
| Moon  | 0     |               | 0      | 0       | 0                     | 0     | 0     | 0    | 0          |        |        | 0     | 9     |
| Lagna | 0     |               | 0      |         | 0                     | 0     | 0     | 0    | 0          |        |        | 0     | 8     |
| Total | 6     | 2             | 6      | 5       | 4                     | 4     | 4     | 3    | 5          | 4      | 2      | 6     | 52    |

*With her pleasing countenance in the form of the moon perceptible and her lovely eyes in the form of the hosts of stars opened and with her mantle of moonshine wrapped round her body, the night looks like a woman who has her limbs covered with a white cloth.*

*- Kishkinda Kanda - Canto 39 - Verse 46*

## SANI'S PARASTHARASHTAKAVARGA

|       | Tula | Vrishchika | Dhanus | Makara | Kumba | Meena | Mesha | Vrishaba      | Mithuna | Kataka                | Simha | Kanya | Total |
|-------|------|------------|--------|--------|-------|-------|-------|---------------|---------|-----------------------|-------|-------|-------|
|       | Sani |            |        | Kuja   |       |       | Sukra | Ravi<br>Budha |         | Lagna<br>Moon<br>Guru |       |       |       |
| Sani  |      | 0          |        |        | 0     | 0     |       |               |         |                       | 0     |       | 4     |
| Guru  |      | 0          | 0      |        |       |       |       | 0             | 0       |                       |       |       | 4     |
| Kuja  | 0    | 0          | 0      |        |       | 0     |       | 0             | 0       |                       |       |       | 6     |
| Ravi  | 0    | 0          |        | 0      | 0     |       |       | 0             |         | 0                     |       |       | 6     |
| Sukra |      |            |        | 0      | 0     |       | 0     |               |         |                       | 0     |       | 4     |
| Budha |      | 0          | 0      | 0      | 0     | 0     |       |               |         |                       |       | 0     | 6     |
| Moon  |      |            | 0      |        |       |       |       | 0             |         |                       |       | 0     | 3     |
| Lagna | 0    | 0          |        |        |       |       | 0     | 0             |         | 0                     |       | 0     | 6     |
| Total | 3    | 4          | 6      | 3      | 4     | 3     | 2     | 5             | 2       | 2                     | 2     | 3     | 39    |

*He who does not awaken even though committing sins through greed or concupiscence, and feels delighted in doing so, sees with his own eyes the end of sinful deeds along with his own like a venomless lizard which perceives its own end through the eating of hallstones.*

*- Aranya Kanda - Canto 29 - Verse 5*

# CHAPTER IX.

## CALCULATION OF DASA, BUKTHI,

### ANTHARA PERIODS.

Dasa Bukthi Periods of Sri Rama as per his age:

| Dasa  | Bukthi | Period |    |    | Age  |      |    |    |      |    |
|-------|--------|--------|----|----|------|------|----|----|------|----|
|       |        | Y      | M  | D  | From |      |    | to |      |    |
|       |        |        |    |    | Y    | M    | D  | Y  | M    | D  |
| Guru  |        |        |    |    | 0    | 0    | 0  | 4  | 0    | 0  |
| Sani  | Sani   | 3      | 0  | 3  | 4    | 0    | 0  | 7  | 0    | 3  |
| "     | Budha  | 2      | 8  | 9  | 7    | 0    | 3  | 8  | 8    | 12 |
| "     | Ketu   | 1      | 1  | 9  | 9    | 8    | 12 | 10 | 9    | 21 |
| "     | Sukra  | 3      | 2  | 0  | 10   | 9    | 21 | 13 | 11   | 21 |
| "     | Ravi   | 0      | 11 | 12 | 13   | 11   | 21 | 14 | 11   | 3  |
| "     | Moon   | 1      | 7  | 0  | 14   | 11   | 3  | 16 | 6    | 3  |
| "     | Kuja   | 1      | 1  | 9  | 16   | 6    | 3  | 17 | 7    | 12 |
| "     | Rahu   | 2      | 10 | 6  | 17   | 7    | 12 | 20 | 5    | 18 |
| "     | Guru   | 2      | 6  | 12 | 20   | 5    | 18 | 23 | 0    | 0  |
| Budha | Budha  | 2      | 4  | 27 | 23   | 0    | 0  | 25 | 4    | 27 |
| "     | Ketu   | 0      | 11 | 27 | 23   | 4    | 27 | 26 | 4    | 24 |
| "     | Sukra  | 2      | 10 | 0  | 26   | 4    | 24 | 29 | 2    | 24 |
| "     | Ravi   | 0      | 10 | 6  | 29   | 2    | 24 | 30 | 1    | 0  |
| "     | Moon   | 1      | 5  | 0  | 30   | 1    | 0  | 31 | 6    | 0  |
| "     | Kuja   | 0      | 11 | 27 | 31   | 6    | 0  | 32 | 5    | 27 |
| "     | Rahu   | 2      | 6  | 18 | 32   | 5    | 27 | 34 | 12   | 15 |
| "     | Guru   | 2      | 3  | 6  | 34   | 12   | 15 | 37 | 3    | 21 |
| "     | Sani   | 2      | 8  | 9  | 37   | 3    | 21 | 40 | 0    | 0  |
| etc.  | etc.   |        |    |    |      | etc. |    |    | etc. |    |



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## SRI RAMA'S DASA, BUKTHI, ANTARA PERIODS AND EVENTS:

| Dasa | Bukthi | Antara | Period in Julian Days<br>and corresponding<br>English Dates in B.C. |                      | Events   |
|------|--------|--------|---|----------------------|--|
|      |        |        | From  | To                   |  |
| 1    | 2      | 3      | 4   | 5                    | 6  |
| Guru |        |        | 102311<br>11-2-4433   | 103751<br>21.1.4429  | Janmas of Sri<br>Rama and<br>brothers.   |
| Sani | Sani   | —      | 103751<br>21.1.4429   | 104834<br>8.1.4426   |  |
| "    | Budha  | —      | 104834<br>8.1.4426  | 105803<br>3.9.4424   |  |
| "    | Ketu   |        | 105803<br>3.9.4424  | 106202<br>7.10.4423  |  |
| "    | Sukra  | Sukra  | 106202<br>7.10.4423   | 106392<br>15.4.4422  |  |
| "    | "      | Ravi   | 106392<br>15.4.4422   | 106449<br>11.6.4422  |  |
| "    | "      | Moon   | 106449<br>11.6.4422   | 106544<br>14.9.4422  |  |
| "    | "      | Kuja   | 106544<br>14.9.4422   | 106610<br>19.11.4422 |  |
| "    | "      | Rahu   | 106610<br>19.11.4422  | 106781<br>9.5.4421   | Sri Rama's<br>sudden depar-<br>ture with<br>Viswamitra;<br>Sita Rama<br>wedding and<br>return to<br>Ayodhya. |
| "    | "      | Guru   | 106781<br>9.5.4421  | 106933<br>8.10.4421  | Happy stay at<br>Ayodhya.  |

|       |       |       |                      |                      |
|-------|-------|-------|----------------------|----------------------|
| "     | "     | Sani  | 106933<br>8.10.4421  | 107114<br>6.4.4420   |
| "     | "     | Budha | 107114<br>6.4.4420   | 107275<br>14.9.4420  |
| "     | "     | Ketu  | 107275<br>14.9.4420  | 107342<br>20.11.4420 |
| Sani  | Ravi  |       | 107342<br>20.11.4420 | 107684<br>28.10.4419 |
| "     | Moon  |       | 107684<br>28.10.4419 | 108254<br>21.5.4417  |
| "     | Kuja  |       | 108254<br>21.5.4417  | 108653<br>23.6.4416  |
| "     | Rahu  |       | 108653<br>23.6.4416  | 109679<br>15.4.4413  |
| "     | Guru  |       | 109679<br>15.4.4413  | 110591<br>13.10.4411 |
| Budha | Budha | Budha | 110591<br>13.10.4411 | 110713<br>12.2.4410  |
| "     | "     | Ketu  | 110713<br>12.2.4410  | 110764<br>4.4.4410   |
| "     | "     | Sukra | 110764<br>4.4.4410   | 110908<br>26.8.4410  |
| "     | "     | Ravi  | 110908<br>26.8.4410  | 110952<br>9.10.4410  |
| "     | "     | Moon  | 110952<br>9.10.4410  | 111024<br>20.12.4410 |
| "     | "     | Kuja  | 111024<br>20.12.4410 | 111075<br>9.2.4409   |
| "     | "     | Rahu  | 111075<br>9.2.4409   | 111205<br>18.6.4409  |

Sri Ram's  
25th Birth Day.  
Arrange-  
ments for  
the coronation



— sudden  
departure on  
exile —  
demise of  
Dasaratha —  
Paduka Pat-  
tabishekam —  
Sri Rama's  
departure  
from  
Chitrakuta  
and reaching  
the ashrama of  
Suthikshna —  
commence-  
ment of stay  
in different  
ashrams.

|       |       |       |                      |                      |   |
|-------|-------|-------|----------------------|----------------------|---|
| Budha | Budha | Guru  | 111205<br>18.6.4409  | 111320<br>12.10.4409 | Stay of Sri<br>Rama and<br>party in<br>various<br>ashrams by<br>rotation till<br>the completion<br>of the tenth<br>year of exile. |
| "     | "     | Sani  | 111320<br>12.10.4409 | 111458<br>26.2.4408  |   |
| "     |       | Ketu  | 111458<br>26.2.4408  | 111815<br>18.2.4407  |   |
| "     |       | Sukra | 111815<br>18.2.4407  | 112835<br>5.12.4405  |   |
| "     |       | Ravi  | 112835<br>5.12.4405  | 5.10.4404            |   |
| "     |       | Moon  | 113141<br>5.10.4404  | 113651<br>27.2.4402  |   |

|       |      |           |            |                  |
|-------|------|-----------|------------|------------------|
| "     | Kuja | 113651    | 114008     |                  |
|       |      | 27.2.4402 | 19.2.4401  |                  |
| "     | Rahu | 114008    | 114926     | Sri Rama's       |
|       |      | 19.2.4401 | 26.8.4399  | 35th Birth       |
|       |      |           |            | Day; meets       |
|       |      |           |            | sage Agastya;    |
|       |      |           |            | stay at panc-    |
|       |      |           |            | chavati.         |
| "     | Guru | Guru      | 114926     | 115034           |
|       |      |           | 26.8.4399  | 12.12.4399       |
| "     | "    | Sani      | 115034     | 115163           |
|       |      |           | 12.12.4309 | 21.4.4398        |
| "     | "    | Budha     | 115163     | 115279           |
|       |      |           | 21.4.4398  | 14.8.4398        |
| "     | "    | Ketu      | 115279     | 115327           |
|       |      |           | 14.8.4398  | 1.10.4398        |
| "     | "    | Sukra     | 15327      | 115463           |
|       |      |           | 1.10.43    | 14.2.4397        |
| "     | "    | Ravi      | 115463     | 115504           |
|       |      |           | 14.2.4397  | 27.3.4397        |
| "     | "    | Moon      | 115504     | 115572           |
|       |      |           | 27.3.4397  | 3.6.4397         |
| "     | "    | Kuja      | 115572     | 115619           |
|       |      |           | 3.6.4397   | 20.7.4397        |
| Budha | Guru | Rahu      | 115619     | 115742           |
|       |      |           | 20.7.4397  | 20.11.4397       |
|       |      |           |            | Surpanaka's      |
|       |      |           |            | visit and Ravana |
|       |      |           |            | abducts Sita     |
| "     | Sani | Sani      | 115742     | 115895           |
|       |      |           | 20.11.4397 | 21.4.4396        |
|       |      |           |            | Surpanaka        |
|       |      |           |            | episode — Sri    |
|       |      |           |            | Rama's 38th      |
|       |      |           |            | Birth Day —      |
|       |      |           |            | Ravana ab-       |
|       |      |           |            | ducts Sita —     |
|       |      |           |            | Sri Rama in      |
|       |      |           |            | search of Sita.  |

|     |     |       |           |           |  |
|-----|-----|-------|-----------|-----------|--|
| "   | "   | Budha | 115895    | 116032    |  |
|     |     |       | 21.4.4396 | 5.9.4396  |  |
| "   | "   | Ketu  | 116032    | 116089    |  |
|     |     |       | 5.9.4396  | 1.11.4396 |  |
| "   | "   | Sukra | 116089    | 116250    |  |
|     |     |       | 1.11.4396 | 11.4.4395 | Sri Rama<br>meets Sugriva;<br>Vali vada;<br>Hanuman's<br>jump to Lanka<br>and his<br>meeting Sita;<br>Sri Rama's<br>sudden depar-<br>ture for<br>Lanka; con-<br>struction of<br>the bridge; an-<br>nihilation of<br>Ravana & his<br>race; Sri<br>Rama's return<br>to Ayodhya<br>and coronation<br>as king of<br>Ayodhya. |
| etc | etc | etc   | etc       | etc       | etc.   |



*Just as the eyes ever strive for the good of the body by showing it the right path, so does the king, who is the fountain of truth and righteousness, ever strive for the good of the state.*

*- Ayodhya Kanda - Canto 67 - Verse 33*

## CHAPTER X.

### SRI RAMA'S DIARY

Anything worth doing is worth doing well. If we wish to study the events in the Ramayana with regard to their timings, it is better to do so in a systematic and mathematical way. In about 125 instances, Valmiki has mentioned about the titi, nakshatra, etc., in point of time, directly or indirectly, of certain events. If we study them casually or taken out of their context we do not get any clear overall picture. At times more confusion arises. Information regarding certain important events is not available; for instance the days exceeded by Angada over the days fixed by Sugriva to search for Sita and the days taken by Sri Rama and the Vanara army to reach the sea shore after their departure from Rishyamukha Hill, etc. Different commentators give different days. Why should this be so? Has Valmiki left any ambiguity about these events? Valmiki would and should have given complete information required by any person who seeks it in his epic which is like any modern encyclopædia. With this strong faith, the author made an attempt to collect and sort out all the information furnished by the poet and arranged them in a chronological order. The date of birth of Sri Rama arrived at viz., the 11th February, 4433 B.C., while casting the detailed horoscope in Chapter II is the basis of the calculations. A judicious method to find out the corresponding Julian Day, the English date in B.C., week day, Baarhaspatya Varsha, Masa, Paksha, Titi, Nakshatra, Dasa, Bukthi, Antara Periods, etc., was suitably devised and adopted.

Except for a few gaps of some uneventful periods, like Sri Rama's stay in Ayodhya after his return following his marriage till the day of the proposal for his coronation as Yuva Raja, stay in the asram of Suteekshna and Panchavati after the lapse of ten years of his exile, etc., Valmiki has almost given an account of the day-to-day activities. All these accounts have been adopted as given by Valmiki under his own authority. Nothing has been assumed out of imagination or intellectual speculation.

The venture is rewarded with good results by His Grace. Not only the timings of the events got well defined and fitted in, but the missing links also got unfolded wonderfully. The results obtained indicate that it is like the diary of the events in Ramayana, with continuity and consistency, presenting a vivid picture with clearness and precision and highlighting certain interesting features. The results are now placed before the readers.

### SRI RAMA'S DIARY

| Julian Day<br>Date in B.C.       | Year<br>Month                               | Nakshatra<br>at midnight<br>in degrees | Events   |
|----------------------------------|---|--|--|
| Week Day                         | Paksha<br>Titi at<br>midnight               |  |  |
|                                  | in figures & at sunrise in<br>letters       |  |  |
| 102311<br>11.2.4433<br>Sunday    | Prabhava<br>Chaitra<br>Sukla<br>Navami 8.19 | Punarvasu<br>84.07/<br>Pushya          | BIRTH OF SRI<br>RAMA   |
| 102312<br>12.2.4433<br>Monday    | Chaitra<br>Sukla<br>Dasami<br>9.2           | Pushya<br>97.25/<br>Aslesha            | Births of Sri<br>Lakshmana<br>and Sri Satrugna   |
| 102323<br>23.2.4433<br>Friday    | Chaitra<br>Krishna<br>Sashti<br>20.38       | Moola<br>242.19                        | Namakarna function<br>was conducted by<br>Sage Vasishta on the<br>completion of the 11th<br>day i.e., on the 12th day. |
| 106682<br>30.1.4421<br>Wednesday | Pramadhi<br>Chaitra<br>Sukla<br>Navami 8.67 | Ardra<br>78.11                         | Sri Rama's 13th<br>Birthday.<br>SANI DASA, SUKRA<br>BUKTHI, RAHU<br>ANTARA:  |

106689      Pramadhi      Hasta  
 6.2.4421      Chaitra      170.17  
 Wednesday      Krishna  
                     Pratama  
                     15.78

Viswamitra arrived unexpectedly and requested Dasaratha to entrust Sri Rama to his care for ten nights (I.20.19) to defeat the two asuras who are hindering his Yagna. Sri Rama and Lakshmana accompanied Viswamitra. All the three walked 6 miles (I.22.10) along the southern bank of the Sarayu river. Viswamitra initiated the Princes in two secret mantras Bala and Atibala (I.22.15). They all slept that night on the south bank of Sarayu river. (I.22.22)

106690      Pramadhi      Chaitra  
 7.2.4421      Chaitra      183.34  
 Thursday      Bahula  
                     Dwitiya  
                     16.8

They reached Kamashrama which was between the rivers Sarayu and Tripathaga in Agna Desa. (I.23.16) Princes were presented to the Ashramites. Viswamitra recounted to the Princes the history of the Ashram. They spent the night as guests of the rishis. (I.23.22)

106691      Pramadhi      Swathi  
 8.2.4421      Chaitra      196.52  
 Friday      Bahula  
                     Tritiya  
                     17.81

They all set out, reached the bank of the river Tripathaga, crossed it by boat and reached Tataka vana. At midstream they

offered homage to the river. Viswamitra recounted the history of Tataka. Tataka was killed. They spent the night in the Tataka vana. (I.26.36)

|                                |   |                    |   |
|--------------------------------|---|--------------------|---|
| 106692<br>9.2.4421<br>Saturday | Pramadi<br>Chaitra<br>Bahula<br>Chaturti<br>18.83 | Vishaka<br>209.7   | They proceeded to Viswamitra's Sidha Ashrama. On the way, Viswamitra presented Sri Rama with all the divine Astras and taught him their use. Viswamitra took vow for the yagna that night itself. They spent the night there. (I.29.32) |
| 106693<br>10.2.4421<br>Sunday  | Pramadi<br>Chaitra<br>Bahula<br>Panchami<br>19.85 | Anurada<br>222.87  | Princes, duly and fully armed, kept vigil for six nights and six days when the Yagna was going on. (I.30.6)   |
| to                             | to  | to                 |   |
| 106698<br>15.2.4421<br>Friday  | Pramadi<br>Chaitra<br>Bahula<br>Dasami<br>24.92   | Shravana<br>288.75 | On the sixth day, the rakshasas Mareecha and Subahu appeared on the site. Subahu was killed. Mareecha was destroyed. Viswamitra was happy.  |
|                                |   |                    | NOTE. This night coincides with the ten nights as requested by Viswamitra from Dasaratha (I.19.118)   |

|  |           |             |   |
|--|-----------|-------------|---|
| 106699   | Pramadi   | Dhanishta   | As suggested and led by Viswamitra they all proceeded to Mithila. In the evening they reached Sona river. They rested for the night there. Viswamitra recounted to the Princes the history of the place, till mid-night, when the Moon just rose. (I.34.15) |
| 16.2.4421  | Chaitra   | 301.93      |   |
| Saturday   | Bahula    |             |   |
|  | Ekadasi   |             |   |
|  | 25.94     |             |   |
| <p><b>NOTE:</b> Only in Bahula Ekadasi, the Moon rises at mid-night. This Ekadasi coincides with the Ekadasi in our chart. This proves that all our above calculations are true and correct.</p> |           |             |   |
| 106700   | Pramadi   | Sathabishag | They all continued their journey, crossed the river Sona and reached river Ganga by noon. They bathed in the holy river and after meal, sat around Viswamitra, who told them the story of Ganga. They all spent the night in the shore of Ganga. (I.45.3)   |
| 17.2.4421  | Chaitra   | 315.11      |   |
| Sunday   | Bahula    |             |   |
|  | Dwadasi   |             |   |
|  | 26.96     |             |   |
| 106701   | Pramadi   | Purva       | They crossed the river Ganga, reached the northern bank, saw Vishala City and stayed for the night there as the guests of King Sumatra. (I.48.10)   |
| 18.2.4421  | Chaitra   | Bhadrapada  |   |
| Monday   | Bahula    | 328.28      |   |
|  | Trayodasi |             |   |
|  | 27.97     |             |   |



|           |            |            |  |
|-----------|------------|------------|--|
| 106702    | Pramadi    | Uttara     | They all resumed their journey. They reached Gautama's Ashram. Viswamitra recounted the story of Ahalya followed by her Sapa Moksha. They then reached the Yagasala in Mithila, where the Yagna was in progress with 12 days more for completion. Sage Sadananda, Preceptor of Janaka, received Viswamitra and recounted to the Princes the story of Viswamitra. They spent the night there. (1.65.36) |
| 19.2.4421 | Chaitra    | Bhadrapada |  |
| Tuesday   | Bahula     | 341.46     |  |
|           | Chaturdasi |            |  |
|           | 28.99 and  |            |  |
|           | later      |            |  |
|           | Amavasya   |            |  |
|           | 30.05      |            |  |
| 106703    | Pramadi    | Revati     | In the morning, Viswamitra introduced the Princes to Janaka and asked him to show the bow to them. On Janaka's orders, the bow was brought. Sri Rama effortlessly lifted it and drew the string back when the mighty bow snapped with a crash like a clap of thunder.  |
| 20.2.4421 | Vaishaka   | 354.64     |  |
| Wednesday | Sukla      |            |  |
|           | Pratama    |            |  |
|           | 0.004      |            |  |
| 106704    | Pramadi    | Aswini     | As advised by Viswamitra, Janaka sent his swiftest messengers to Ayodhya to give the happy news to Dasaratha and invite him.   |
| 21.2.4421 | Vaishaka   | 7.81       |  |
| Thursday  | Sukla      |            |  |
|           | Dwitiya    |            |  |
|           | 1.019      |            |  |

|                                 |   |   |   |
|---------------------------------|---|---|---|
| 106707<br>24.2.4421<br>Sunday   | Pramadi<br>Vaishaka<br>Sukla<br>Panchami<br>4.07  | Rohini<br>47.34                           | After three nights, messengers reached Ayodhya and conveyed the message to king Dasaratha, who then decided to leave for Mithila the next day.  |
| 106708<br>25.2.4421<br>Monday   | Pramadi<br>Vaishaka<br>Sukla<br>Sashti<br>5.08    | Mrigasirsha<br>60.51                      | Dasaratha left for Mithila with his retinue.  |
| 106712<br>1.3.4421<br>Friday    | Pramadi<br>Vaishaka<br>Sukla<br>Dasami<br>9.15    | Aslesha<br>113.22                         | After four days of journey, Dasaratha reached Mithila (I.69.1) and met Janaka who welcomed him, with customary courtesies.  |
| 106713<br>2.3.4421<br>Saturday. | Pramadi<br>Vaishaka<br>Sukla<br>Ekadasi<br>10.16  | Makha<br>126.4<br>(I.71.23)               | Balance of 12 days of Janaka's Yagna got completed this day (I.71.23). Nischayatartha function was done forthwith in Makha Nakshatra (I.71.23)<br><br><b>NOTE:</b> Makha Nakshatra of Valmiki tallies with that of our chart. |
| 106714<br>3.3.4421<br>Sunday    | Pramadi<br>Vaishaka<br>Sukla<br>Dwadasi<br>11.18  | Purva<br>Palguna<br>139.58                | Godhana etc., was done (I.72.2)   |
| 106715<br>4.3.4421<br>Monday    | Pramadi<br>Vaishaka<br>Sukla<br>Trayodasi<br>12.2 | Uttara<br>Phalgun<br>152.75<br>(I. 71.24) | <b>WEDDING OF SITA AND RAMA</b> at the appointed day and time.<br><b>NOTE:</b> Nakshatra of our chart coincides with that given by Valmiki in I.71.24   |

|           |            |           |   |
|-----------|------------|-----------|---|
| 106716    | Pramadi    | Hasta     | Viswamitra abruptly left for Himalayas. (1.74.2).   |
| 5.3.4421  | Vaisaka    | 165.93    | Dasaratha took leave of Janaka and left for Ayodhya with the Princes and their wives and his retinue. Enroute occurred the encounter with Parasurama and his subjugation. After they reached Ayodhya, they lived happily with their spouses, for nearly twelve years till the 25th Birth Day of Sri Rama.   |
| Tuesday   | Sukla      |           |   |
|           | Chaturdasi |           |   |
|           | 13.21      |           |   |
| 111081    | Kara       | Punarvasu | Sri Rama's 25th Birth Day. Dasaratha thought of crowning Sri Rama as Yuvaraja. He had the Raja Sabha convened immediately. He sought the permission of the members to do so. All in that great assembly acclaimed with one voice and in joy "so be it". He then promptly ordered for all the preparations for the Pattabisheka function on the very next day. |
| 15.2.4409 | Chaitra    | 80.73     |   |
| Saturday  | Sukla      |           |   |
|           | Ashtami    |           |   |
|           | 7.59       |           |   |
| 111082    | Kara       | Pushya    | Arrangements were in full swing for the Pattabisheka ceremony of Sri Rama. The city was in a festive mood and in a joyous commotion of expectations. Overnight  |
| 16.2.4409 | Chaitra    | 93.91     |   |
| Sunday    | Sukla      |           |   |
|           | Navami     |           |   |
|           | 8.61       |           |   |

developments in a dramatic way in the inner apartments made Sri Rama leave abruptly for vana vasa (for the fulfilment of his avatar) with Sita and Lakshmana. They reached Thamasa river and spent the night on the northern bank (II.46.15)

|           |         |         |  |
|-----------|---------|---------|--|
| 111083    | Khara   | Aslesha | They crossed Tamasa river long before dawn and travelled far into the forest crossing several streams. They reached the southern boundary of Khosala country. They spent the night there (II.49.2).  |
| 17.2.4409 | Chaitra | 107.09  |  |
| Monday    | Sukla   |         |  |
|           | Dasami  | 9.63    |  |
| 111084    | Khara   | Makha   | At dawn, after sandhyavandanam, they resumed their journey forward, till the chariot reached the northern bank of river Ganga. They proceeded along the bank till they found a spot of surpassing charm to spend the night there (II.50.57). Guha, Chief of the region |
| 18.2.4409 | Chaitra | 120.26  |  |
| Tuesday   | Sukla   |         |  |
|           | Ekadasi | 10.64   |  |

|           |         |         |
|-----------|---------|---------|
| 111085    | Khara   | Purva   |
| 19.2.4409 | Chaitra | Palguni |
| Wednesday | Sukla   | 133.44  |
|           | Dwadasi |         |
|           | 11.66   |         |

welcomed and greeted them with a warm embrace.

At dawn, the Princes got their locks matted with the milk of the banyan. They bid farewell to Sumantra and Guha and crossed the river by boat. At mid stream Sita offered prayers to the Goddess Ganga. After reaching the southern bank, they proceeded further till they reached a banyan tree. They spent the night under the tree. Sri Lakshmana kept vigil the whole night, as they were alone unattended by friends.

|           |           |         |
|-----------|-----------|---------|
| 111086    | Khara     | Uttara  |
| 20.2.4409 | Chaitra   | Palguni |
| Thursday  | Sukla     | 146.62  |
|           | Trayodasi |         |
|           | 12.68     |         |

At day dawn, the three left for the Ashram of Sage Bharadwaja, reached at dusk and spent the night there as welcome guests of the Sage (II.54.35)

Just after dusk, Sumantra should have got indications by some quick communication, perhaps more or less akin to our present day wireless system, that Sri Rama with Sita and Sri Lakshmana reached the ashram of Bharadwaja and on his advice, they

|           |            |        |
|-----------|------------|--------|
| 111087    | Khara      | Hasta  |
| 21.2.4409 | Chaitra    | 159.79 |
| Friday    | Sukla      |        |
|           | Chaturdasi |        |
|           | 13.69 and  |        |
|           | Purnami    |        |
|           | from 7H..  |        |
|           | 23m.53s.   |        |

are intending to go towards Chitra Kuta for their stay (II.57.2).

Sumantra left immediately for Ayodhya driving the chariot fast.

At day dawn, Sri Rama with Sita and Sri Lakshmana, sought the guidance of Sage Bharadwaja on the route to follow to Chitrakuta and on his instructions left for Chitrakuta. They reached the river Yamuna and spent the night on its bank.

Sumantra reached Ayodhya on the second day evening (II.57.5). He promptly reported to Dasaratha the message of Sri Rama and other details. Dasaratha's life slowly ebbed and breathed his last, during his sleep after midnight, by which time the titi Purnima had set in.

NOTE. The titi in our chart tallies.

|           |         |         |
|-----------|---------|---------|
| 111088    | Khara   | Chaitra |
| 22.2.4409 | Chaitra | 172.97  |
| Saturday  | Sukla   |         |
|           | Purnami |         |
|           | 14.71   |         |

Sri Rama and party resumed their journey at day dawn (II.55.1) and reached Chitra kuta hill (II.56.10). Sri Lakshmana constructed a mud hut

with jungle materials. They performed Vastu Homa etc., and entered the hut (II.56.35). They started living in it happily (II.56.38).

At Ayodhya, Vasishta<sup>1</sup> sent swift messengers to Bharata for his immediate return to Ayodhya (II.68.11). The messengers reached the city of Girivaraja and spent the night there. During that night, Bharata had bad dreams.

111089  
23.2.4409  
Sunday

Khara  
Chaitra  
Bahula  
Pratama  
15.72

Swathi  
186.15

Sri Bharata was narrating his bad dreams in the Assembly when the messengers reached there to convey the urgent message from Vasishta. Sri Bharata left for Ayodhya immediately (11.70.28). He reached Jambuprastham village in the night and stayed there (11.71.12),

|                                  |   |                      |  |
|----------------------------------|---|----------------------|--|
| 111090<br>24.2.4409<br>Monday    | Khara<br>Chaitra<br>Bahula<br>Dwitiya<br>16.74  | Vishaka<br>199.32    | Sri Bharata reached the Sarvatita village and spent the second night (II.7.118).   |
| 111091<br>25.2.4409<br>Tuesday   | Khara<br>Chaitra<br>Bahula<br>Tritiya<br>17.76  | Anurada<br>212.5     | Sri Bharata reached Acha Mara Vana and spent the night (II.7.118).   |
| 111092<br>26.2.4409<br>Wednesday | Khara<br>Chaitra<br>Bahula<br>Chaturti<br>18.77 | Jeyshta<br>225.67    | Sri Bharata continued his journey towards Ayodhya.   |
| 111096<br>2.3.4409<br>Sunday     | Khara<br>Chaitra<br>Bahula<br>Ashtami<br>22.83  | Moola<br>278.38      | In the evening of the 8th day, Sri Bharata reached Ayodhya (II. 71.32). He heard the sad news of his father's demise and lamented the whole night. |
| 111097<br>3.3.4409<br>Monday     | Khara<br>Chaitra<br>Bahula<br>Navami<br>23.85   | Dhanishta<br>291.55  | Sri Bharata performed the obsequies of his father (II.76.3)  |
| 111107<br>13.3.4409<br>Thursday  | Khara<br>Vaishaka<br>Sukla Panchami 4.01        | Mrigasirsha<br>63.32 | Punyavachana ceremony was performed. (II.77.1)   |



|                                 |   |                    |  |
|---------------------------------|---|--------------------|--|
| 111108<br>14.3.4409<br>Friday   | Khara<br>Vaisaka<br>Sukla Sashti<br>5.02    | Ardra 76.5         | Sri Bharata performed the Shradha ceremony (II.77.1)   |
| 111109<br>15.3.4409<br>Saturday | Khara<br>Vaisaka<br>Sukla Sap-<br>tami 6.04 | Punarvasu<br>89.67 | Sanchayana on the 13th day (II.77.4)   |
| 111110<br>16.3.4409<br>Sunday   | Khara<br>Vaisaka<br>Sukla<br>Ashtami 7.06   | Pushya<br>102.85   | On the 14th day, Sri Bharata was requested by Vasishtha and the whole assembly to get annointed as the King. He declined and decided to proceed to the forests to bring Sri Rama to enthrone him as the King of Ayodhya and spent the first auspicious night (II.81.1) |
| 111111<br>17.3.44<br>Monday     | Khara<br>Vaisaka<br>Sukla<br>Navami 8.07    | Aslesha<br>116.02  | At dawn and at an auspicious muhurtam Bharata left with his following (II.83.1). He reached the bank of the Ganga in the evening. Guha met and received him. Hosted by Guha, he spent the night there.   |
| 111112<br>18.3.4409<br>Tuesday  | Khara<br>Vaisaka<br>Sukla<br>Dasami 9.09    | Makha 129.2        | At dawn and at Maitra muhurta they crossed the Ganga by boats arranged by Guha. They reached Bharadwaja s Ashram in the evening. The sage entertained them. They all spent the night at the Ashram.  |

111113 Khara Purva  
 19.3.4409 Vaisaka Palguna  
 Wednesday Sukla Ekadasi 142.38  
 10.11

In the morning, they left for Chitrakuta, as directed by the sage and met Sri Rama. Sri Bharata informed them about the demise of Dasaratha. They offered libations to Dasaratha. Sri Bharata requested Sri Rama to return to Ayodhya and rule as King. They spent the night (II.103.2)

111114 Khara Uttara  
 20.3.4409 Vaisaka Palguna  
 Thursday Sukla 155.55  
 Dwadasi  
 11.12

Discussions were resumed in the morning. After arguments and counter arguments, it was agreed that Sri Bharata would rule the country with the Padukas of Sri Rama as token till the return of Sri Rama after his exile. Sri Rama placed his feet on the sandals and handed them over to Sri Bharata. Sri Bharata then started back for Ayodhya.

111115 Khara Hasta  
 21.3.4409 Vaisaka 168.73  
 Friday Sukla  
 Trayodasi  
 12.14

After Sri Bharata's departure, Sri Rama noticed some unhappiness among the ashrama rishis. He learnt that since his arrival rakshasas from Janasthana were troubling them and that they were thinking of shifting from there.

|           |            |         |   |
|-----------|------------|---------|---|
| 111116    | Khara      | Chaitra | The ashramites left the ashram after taking leave of Sri Rāma. Sri Rama too changed his mind and decided to shift from Chitrakuta and left that place with Sita and Sri Lakshmana (II.1.16)   |
| 22.3.4409 | Vaisaka    | 181.91  |   |
| Saturday  | Sukla      |         |   |
|           | Chaturdasi |         |   |
|           | 13.15      |         |   |
| 111117    | Khara      | Swati   | The Princes and Sita reached the Ashram of Atri. Anasuya presented gifts to Sita. The Sun was setting and the Moon rising.  |
| 23.3.4409 | Vaisaka    | 195.08  |   |
| Sunday    | Sukla      |         |   |
|           | Purnami    |         |   |
|           | 14.17      |         |   |
| 111118    | Khara      | Vishaka | NOTE: Sunset and Moon rise simultaneously on this day indicates purnami and tallies with our chart. At dawn they proceeded to a spot where rishis were staying and spent the night there, as guests of rishis (II.2.1)  |
| 24.3.4409 | Vaisaka    | 208.26  |   |
| Monday    | Bahula     |         |   |
|           | Pratama    |         |   |
|           | 15.18      |         |   |
| 111119    | Khara      | Jeyshta | At dawn, they resumed their journey. En route, they met Viradha, smashed him and buried him. As advised by him, they proceeded to Sharabanga's ashram and reached it in the evening (VI.129.4) After meeting them Sharabanga departed to the world of Indira. The Princes and Sita reached the ashram of Suthikshna and stayed there for the night. |
| 25.3.4409 | Vaisaka    | 234.61  |   |
| Tuesday   | Bahula     |         |   |
|           | Dwitiya    |         |   |
|           | 16.2       |         |   |

|           |         |         |
|-----------|---------|---------|
| 111120    | Khara   | Jeyshta |
| 26.3.4409 | Vaisaka | 234.61  |
| Wednesday | Bahula  |         |
|           | Tritiya |         |
|           | 17.22   |         |

At day break, they took leave of Suthikshna, who invited them again and resumed their journey. They saw a beautiful lake from which sweet music was emanating. Getting curious, they enquired from a rishi by name Dharmabrith. He recounted the story. They met a few more rishis and spent some time in their company.

|    |    |    |
|----|----|----|
| to | to | to |
|----|----|----|

They started living quietly among the rishis a month in one ashram, three months in the second and perhaps one year in the third etc., in rotation, as happy welcome guests, till the end of the 10th year of exile. When they visited Sutikshna's ashram again, the 10th year was completed.

|           |         |           |
|-----------|---------|-----------|
| 114742    | Pilava  | Punarvasu |
| 23.2.4399 | Chaitra |           |
| Saturday  | Sukla   | 79.38     |
|           | Saptami |           |
|           | 6.79    |           |

**Budha Dasa, Rahu  
Bukthi, Ketu Antara**

On Sri Rama's fine 35th Birth Day morning and at the commencement of the 11th year of exile, Sri Rama expressed his wish to see Sage Agastya. As advised and directed by the sage, they took leave of him and proceeded

114743 Pilava Pushya  
24.2.4399 Chaitra 92.56  
Sunday Sukla  
Ashtami  
7.81

114744 Pilava Aslesha  
25.2.4399 Chaitra 105.74  
Monday Sukla  
Navami  
8.82

114745 Pilava Makha  
26.2.4399 Chaitra 118.91  
Tuesday Sukla  
Dasami  
9.84

towards the ashram of Agastya.

They visited the ashram of Agastya's younger brother on the way and spent the night there.

In the morning they reached the ashram of Agastya. The Sage warmly welcomed them and presented Brahma Astra. He advised Sri Rama to spend the rest of his exile in Panchavati.

In the morning, they took leave of Sage Agastya and proceeded towards Panchavati. On their way, they met Jatayu, a huge figure. Jatayu offered that he would take care of Sita whenever the Princes go out. They then reached panchavati. Lakshmana constructed a mud hut. Sri Rama praised him and gave him a warm embrace. They performed religious ceremonies and lived there happily.

**Budha Dasa, Guru Bukthi,  
Rahu Antara**

|           |         |              |                            |
|-----------|---------|--------------|----------------------------|
| 115815    | Krodhi  | Chitra       | While the three viz., Sri  |
| 31.1.4396 | Palguna | 177.62       | Rama, Sita and Sri         |
| Monday    | Bahula  | (See Note    | Lakshmana were whiling     |
|           | Dwitiya | on III.17.4) | away the hours after their |
|           | 16.85   |              | morning duties, Sur-       |
|           |         |              | panaka chanced to come     |
|           |         |              | to the ashram. After see-  |
|           |         |              | ing Sri Rama, she made     |
|           |         |              | overtures and got her      |
|           |         |              | nose and ear mutilated     |
|           |         |              | by Sri Lakshmana. She      |
|           |         |              | then rushed to her         |
|           |         |              | brother Khara crying and   |
|           |         |              | reported to him. When      |
|           |         |              | he intervened, he and      |
| to        | to      | to           | his entire army were li-   |
|           |         |              | quidated by Sri Rama,      |
|           |         |              | single handed. She then    |
|           |         |              | appeared before Ravana,    |
|           |         |              | bleeding and mutilated     |
|           |         |              | and sought vengeance.      |
|           |         |              | This prompted Ravana       |
|           |         |              | to approach Mareecha       |
|           |         |              | and made him transform     |
|           |         |              | himself as a golden deer   |
|           |         |              | to tempt Sita to ask Sri   |
|           |         |              | Rama to fetch it for her.  |
|           |         |              | The plan clicked.          |
| 115835    | Krodhi  | Punarvasu    | Sri Rama's 38th Birth      |
| 20.2.4396 | Chaitra | 81.14        | Day. Ravana abducted       |
| Sunday    | Sukla   |              | Sita. Jatayu threw himself |
|           | Ashtami |              | in the way but his wings   |
|           | 7.16    |              | and talons were cut off by |
|           |         |              | Ravana. Jatayu fell on     |
|           |         |              | the ground unable to       |
|           |         |              | move.                      |
|           |         |              | Sri Rama returned to the   |
|           |         |              | ashrama where he did       |

not find Sita. He lamented and roamed about in search of Sita. He saw Jatayu before death and got the information. Sri Rama performed Jatayu's obsequies. Sri Rama and Lakshmana then met Kabanda. After cutting his arms, they set fire to his body as desired by him. Kabanda asked them to see Sugriva who was staying in Rishyamukha hill.

Then they visited the ashram of Sabari and accepted her hospitality. She then entered the fire and ascended to heaven. The Princes were then roaming about in the forest over the Pampa region, to meet Sugriva. Meanwhile Sugriva became suspicious noticing the movements of the Princes. It was Hanuman who met the Princes and introduced them to Sugriva. Sugriva and Sri Rama entered into a pact of friendship for their mutual benefit. They shared their thoughts. Sugriva revealed his fear from Vali. Sri Rama

made an instantaneous promise to kill Vali and did so. Sri Rama crowned Sugriva as King of Kishkinda.

The rainy season began. So the search for Sita had to be stayed, till the end of the rainy season. Sugriva spent his time in enjoyment in Kishkinda. Sri Rama and Lakshmana spent the weary days waiting in a cave nearby, for the month of Karthika to come.

to to to

#### Budha Dasa, Sani Bukthi, Budha Antara

|            |         |            |                            |
|------------|---------|------------|----------------------------|
| 116100     | Khrodi  | Purva      | Sugriva sent vanaras to    |
| 12.11.4396 | Pushya  | Bhadrapada | the four corners of the    |
| Saturday   | Sukla   | 332.88     | earth to make a thorough   |
|            | Saptami |            | search for Sita and return |
|            | 6.38    |            | in a month. He gave        |
|            |         |            | them detailed instruc-     |
|            |         |            | tions and warned them      |
|            |         |            | not to exceed a month on   |
|            |         |            | any account.               |

|            |         |           |                            |
|------------|---------|-----------|----------------------------|
| to         | to      | to        |                            |
| 116130     | Khrodhi | Aswini    | Last day for the vanaras   |
| 12.12.4396 | Magha   | 8.17      | to return after search for |
| Thursday   | Sukla   | See       | Sita. All the vanaras ex-  |
|            | Saptami | Note X -2 | cept those who went        |
|            | 6.85    |           | Southward returned and     |
|            |         |           | reported to Sugriva that   |
|            |         |           | they could not locate Sita |
|            |         |           | or Ravana.                 |
| to         | to      | to        |                            |



Angada and party were in the cave of a Tapaswini on this day. When they came out of the cave, Angada realised that they have exceeded the target date. They could not locate Sita. Due to fear of Sugriva, Angada decided to fast and seek death. Vanaras were recalling the past and talking to one another. When they recounted about Jatayu and his death, Sampati who happened to be there overheard the discussion. He was grieved to learn about the demise of his brother. Making good use of his capacity to look at distant objects, he informed them that he could locate Sita in Lanka. The vanaras became very happy. They conferred as to how to cross the sea. Finally Jambavan persuaded Hanuman to undertake the uphill task. Hanuman selected a suitable place on the top of the Mahendra hill and got ready to jump to Lanka.

|            |            |         |
|------------|------------|---------|
| 116138     | Khrodhi    | Aslesha |
| 20.12.4396 | Magha      | 113.58  |
| Friday     | Sukla      |         |
|            | Chaturdasi |         |
|            | 13.97 and  |         |
|            | Purnima    |         |
|            | from       |         |
|            | 1h.13m.    |         |
|            | 57 sec.    |         |

Hanuman landed in Lanka in the evening. When the sun had set, Moon set in and shone brightly, to help Hanuman in the search for Sita. But he could not locate her. He got dejected and bowed to the Gods in prayer. Just then he saw a park viz., Ashoka vana where he had not searched earlier. He climbed up and sat hidden among the leaves of a tree, hoping Sita would certainly come to the garden for her sandyavandanam. When he looked under the tree, he saw a lady seated. He took a long look at the face of Sita, as the Moon also in that early morning shone brightly as if on purpose to help him. He then saw Ravana approach her with a retinue. Hidden in the tree, He watched what was going on below. When Ravana went away, Hanuman started narrating the story of Sri Rama. When Sita looked at him, he approached her and gave the message of Sri Rama and the signet ring.

|            |         |        |
|------------|---------|--------|
| 116139     | Khrodhi | Makha  |
| 21.12.4396 | Magha   | 126.76 |
| Saturday   | Bahula  |        |
|            | Pratama |        |
|            | 15.99   |        |

Hanuman comforted Sita saying that Sri Rama would soon arrive to annihilate Ravana and his race and regain her. He received choodamani from her. He then commenced to destroy the park so as to catch the attention of Ravana.

Ravana sent a few warrior chiefs to capture Hanuman. But Hanuman killed them all. Finally he was bound by the Brahma Astra of Indrajit and was taken before Ravana. Hanuman told Ravana that he was the messenger of Sri Rama and advised him to turn to the path of Dharma. Angered at his words, Ravana ordered his men to set fire to the tail of Hanuman. It was done. Hanuman then set fire to all the buildings in Lanka. He went and saw Sita. He then took leave of her to return to Sri Rama and jumped back.

|            |         |          |
|------------|---------|----------|
| 116140     | Khrodhi | Purva    |
| 22.12.4397 | Magha   | Phalguna |
| Sunday     | Bahula  | 139.33   |
|            | Tritiya |          |
|            | 17.01   |          |

Hanuman landed on the Mahendra hill and was welcomed by Jambavan and others with great affection. He conveyed the glad news that he saw Sita.

|            |          |          |
|------------|----------|----------|
| 116141     | Khrodhi  | Uttara   |
| 23.12.4396 | Magha    | Phalguna |
| Friday     | Bahula   | 153.11   |
|            | Chaturti |          |

safe in Ashok vana. They all conferred and decided to rush to Sri Rama and report everything and then do what they were asked to do. En route they entered the protected park and drank honey and fruits.

Dhādhimuka, the keeper of the park, hurried to Sugriva and complained. Sugriva understood the position and asked the keeper to send them all to him at once. Dhādhimukha hastened and conveyed to them the king's commands. The vānaras then rushed to the presence of their king and Sri Rama. Hanuman bowed and said 'SEEN HAVE I SITA, THE GODDESS OF PURITY', and handed over the chooda-mani to Sri Rama. Inspired and cheered by Hanuman, Sri Rama took a snap decision and gave the order to proceed to Lanka, forthwith. Under the star of triumph, Uttara Phalguna, (VI.4.6) at high noon which is the Vijaya muhūrtha, they set forward, greeted by good omens.

**NOTE:** the Nakshatra Uttara Phalgunā given by Valmiki in VI.4.5 tallies with our chart confirming all our calculations correct.

|          |           |         |
|----------|-----------|---------|
| 116158   | Viswavasū | Bharani |
| 9.1.4395 | Palgunā   | 17.11   |
| Monday   | Sukla     |         |
|          | Sashti    |         |
|          | 5.3       |         |

They reached the Mahendra mountain, on the sea shore (VI.4.101). They all camped in the forest by the sea shore. (VI.5.23)

|           |           |          |
|-----------|-----------|----------|
| 116159    | Viswavasū | Krithigā |
| 10.1.4395 | Palgunā   | 30.28    |
| Tuesday   | Sukla     |          |
|           | Saptami   |          |
|           | 6.31      |          |

Kumbakarāna and Vibhishna tendered advice to Ravana to restore Sita to Sri Rama. Realising that he had no place for himself in Lanka there after, Vibhishna rose to the sky and proceeded to the spot where Sri Rama was camping. Vibhishna spoke from the sky that he wished to surrender to Sri Rama and prayed for protection. After conferring with those present, Sri Rama decided to take Vibhishna in his camp. He promised to make him the King of Lanka and a token Pattabisheka was performed. Suggested by Vibhishna, Sri Rama began a fast with a request to the sea-god for a causeway.

|                                     |   |                      |  |
|-------------------------------------|---|----------------------|--|
| 116160 of<br>11.1.4395<br>Wednesday | Viswavaha<br>Palguna<br>Sukla<br>Ashtami<br>7.32  | Rohini<br>43.46      | 2nd day of fasting.  |
| 116161<br>12.1.4395<br>Thursday     | Viswavaha<br>Palguna<br>Sukla<br>Navami<br>8.34   | Mrigasirsha<br>56.64 | 3rd day of fasting   |
| 116162<br>13.1.4395<br>Friday       | Viswavaha<br>Palguna<br>Sukla<br>Dasami<br>9.36   | Ardra<br>69.81       | On the 4th day, as the sea-god did not respond Sri Rama got angry and shot an arrow into the bosom of the sea. The sea-god then appeared before Sri Rama and showed a favourable place for a causeway to be built by Nala, who had the ability to do the job. Sri Rama accepted the offer of help and ordered for the work to begin. All evinced great enthusiasm in the gigantic task.<br>14 yojanas were covered on the 1st day. |
| 116163<br>14.1.4395<br>Saturday     | Viswavaha<br>Palguna<br>Sukla<br>Ekadasi<br>10.37 | Punarvasu<br>82.99   | 20 yojanas were covered on the 2nd day.  |

|                                  |   |                             |  |
|----------------------------------|---|-----------------------------|--|
| 116164<br>15.1.4395<br>Sunday    | Viswavaha<br>Palguna<br>Sukla<br>Dwadasi<br>11.39               | Pushya<br>96.16             | 21 yojanas were covered<br>on the 3rd day.   |
| 116165<br>16.1.4395<br>Monday    | Viswavaha<br>Palguna<br>Sukla<br>Trayodasi<br>12.41             | Aslesha<br>109.34           | 22 yojanas were covered<br>on the 4th day.   |
| 116166<br>17.1.4395<br>Tuesday   | Viswavaha<br>Palguna<br>Sukla<br>Chaturdasi<br>13.42            | Makha<br>122.51             | 23 yojanas were covered<br>on the 5th day.   |
| 116167<br>18.1.4395<br>Wednesday | Viswavaha<br>Palguna<br>Sukla<br>Purnami<br>14.44<br>(VI.38.79) | Purva<br>Palguna<br>135.69  | The construction of the<br>causeway was complete.<br>Then they went on the<br>causeway. Hanuman car-<br>ried Sri Rama on his<br>shoulders and Angada<br>carried Sri Lakshmana<br>on his. They crossed the<br>sea and rested for the<br>night of the Purnami<br>(VI.38.19) on Mount<br>Suvela.      |
| 116168<br>19.1.4395<br>Thursday  | Viswavaha<br>Palguna<br>Bahula<br>Pratama<br>15.46              | Uttara<br>Palguna<br>148.87 | NOTE: Purnami titi in<br>our chart tallies with that<br>given by Valmiki in<br>VI.38.19 there by confirm-<br>ing that all our previous<br>calculations are correct.<br><br>In the morning, Sri<br>Rama standing on the<br>mountain top had an<br>aerial survey of Lanka.<br>The army then descend- |

ed from the mount and took positions as ordered by Sri Rama. Sri Rama sent a message through Angada to return Sita or face a war. Ravana did not respond.

#### BATTLE BEGAN:

It began with a fierce duel between individual warriors for the entire day time. In the night also the battle continued; the Princes were bound by Serpent Darts by Indrajit, but the darts disappeared when Garuda arrived. Vanaras resumed attack with jubilant acclamations. After losing Dhoomrakshaka, Vajradanta, Akampana in the night itself Ravana got upset.

|           |           |        |
|-----------|-----------|--------|
| 116169    | Viswavaha | Hasta  |
| 20.1.4395 | Palguna   | 162.05 |
| Friday    | Bahula    |        |
|           | Dwitiya   |        |
|           | 16.48     |        |

Prahasta was then deputed by Ravana to fight and was killed by Neela. Then Ravana himself went to the front. Sri Rama broke his crown and chariot. Seeing Ravana unarmed, Sri Rama asked him to retire from the field and come back again fully armed and prepared. Ravana



felt humbled. Kumbakarna was then roused from sleep with some efforts. He had gone to sleep nine days before after giving his advice to Ravana along with Vibhishna.

to

to

to

**NOTE:** These nine days tally with our chart

Kumbakarna went to the battle field. His head was cut off by an arrow of Sri Rama. Then perhaps on each day the following warrior chiefs were killed by different warriors of Sri Rama. Narantaka was killed by Angada. Devantaka and Trisira were slain by Hanuman. Mahedara was killed by Neela.

to

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to

Atikaya fell a prey to Lakshmana's arrow

116174  
25.1.4395  
Wednesday

Viswavaha  
Bahula  
Saptami  
21.56

Jeyshta  
227.92

Indrajit went to the battle field. He tied up the Princes by Brahma Astra. Sanjeevi hill was brought by Hanuman which made the darts slip away

|                                 |  |                            |  |
|---------------------------------|--|----------------------------|--|
|                                 |  |                            | and cured the wounds. Vanaras then set fire to the buildings of Lanka that night.  |
| 116175<br>26.1.4395<br>Thursday | Viswavaha<br>Palguna<br>Bahula<br>Ashtami<br>22.57   | Moola<br>241.1             | Kumba was slain by Sugriva and Nikumba by Hanuman.   |
| 116176<br>27.1.4395<br>Friday   | Viswavaha<br>Palguna<br>Bahula<br>Navami<br>23.59    | Poorva<br>Ashada<br>254.28 | Nakaraksha fell a prey to Sri Rama's arrows, in the night.   |
| 116177<br>28.1.4395<br>Saturday | Viswavaha<br>Palguna<br>Bahula<br>Dasami<br>24.6     | Uttara<br>Ashada<br>267.46 | At the bidding of Ravana, Indrajit went again to the battlefield and staged a drama of Maya Sita vadha before the vanaras, thereby gaining time to perform the asuric sacrifice. Vibhishna advised Sri Rama to depute Lakshmana at once to mar the purpose of Indrajit. Fierce battle followed between Sri Lakshmana and Indrajit for three days and nights. |
| 116180<br>31.1.4395<br>Tuesday  | Viswavaha<br>Palguna<br>Bahula<br>Trayodasi<br>27.65 | Sathabishag<br>306.99      | Finally when Sri Lakshmana invoked Sri Rama and shot the Indra Astra to strike Indrajit, it killed Indrajit. Sri Lakshmana went to Sri Rama who gave him a   |

|           |            |            |   |
|-----------|------------|------------|---|
|           |            |            | warm embrace as a reward for his victory. |
| 116181    | Viswavaha  | Poorva     | Ravana's grief and anger                  |
| 1.2.4395  | Palguna    | Bhadrapada | swelled, when he was told                 |
| Wednesday | Bahula     | 320.16     | that Indrajit was killed.                 |
|           | Chaturdasi |            | He went to Ashoka vana                    |
|           | 28.67      |            | to kill Sita. He was stop-                |
|           | (VI.93.65) |            | ped by his minister                       |
|           |            |            | Suparsava. He said that it                |
|           |            |            | would be New Moon day                     |
|           |            |            | next day as it is Krishna                 |
|           |            |            | Paksha Chaturdasi                         |
|           |            |            | (VI.93.65) and he could                   |
|           |            |            | go with renewed vigour to                 |
|           |            |            | the battle field and                      |
|           |            |            | achieve victory. Ravana                   |
|           |            |            | felt that Suprava was                     |
|           |            |            | right and abandoned the                   |
|           |            |            | idea of killing Sita.                     |
|           |            |            | NOTE: Krishna Chatur-                     |
|           |            |            | dasi tallies with our chart               |
|           |            |            | confirming that ours is                   |
|           |            |            | correct.                                  |
| 116182    | Viswavaha  | Uttara     | Ravana went to the bat-                   |
| 2.2.4395  | Palguna    | Bhadrapada | tlefield again. Rama-                     |
| Thursday  | Bahula     | Revati     | Ravana Yudha was wag-                     |
|           | Amavasya   |            | ed with no parallel to it.                |
|           | 29.68      |            | Ravana was wounded                        |
|           |            |            | and fell unconscious. His                 |
|           |            |            | charioteer took him out                   |
|           |            |            | of the field. When                        |
|           |            |            | Ravana regained con-                      |
|           |            |            | sciousness, he asked the                  |
|           |            |            | charioteer to take him                    |
|           |            |            | back to the front. Mean-                  |
| to        | to         | to         | while Sage Agastya in-                    |
|           |            |            | initiated Aditya                          |
|           |            |            | Hirudayam to Sri Rama                     |

|                                |   |                       |  |
|--------------------------------|---|-----------------------|--|
|                                |   |                       | and Sri Ramā chanted the same. Rama-Ravana fight resumed.  |
| 116185 ,<br>5.2.4395<br>Sunday | Viswavaha<br>Chaitra<br>Sukla<br>Tritiya<br>2.73  | Kritiga/<br>Rohini    | At the most appropriate moment, Matali reminded Sri Rama about the Brahma Astra. Sri Rama used that Astra. Ravana was killed. On the suggestion of Sri Rama, Vibhishna performed obsequies of Ravana.  |
| 116186<br>6.2.4395<br>Monday   | Viswavaha<br>Chaitra<br>Sukla<br>Chaturti<br>3.74 | Rohini<br>Mrigasirsha | Perhaps on this day after the auspicious bath, Vibhishna was crowned as the King of Lanka. When Sita went to Sri Rama and after the unexpected words from him, she jumped into the burning fire, kindled by Sri Lakshmana at her bidding. Agni, God of fire, emerged from the fire with Sita in his hands and presented her to Sri Rama. Sri Rama accepted her saying, as he drew her to his side, that all this ordeal was for public satisfaction. Then Dasaratha descended from above and blessed them. Indra appeared bestowed his boon and vanaras who died regained their lives. |

116187  
7.2.4395  
Tuesday

Viswavaha  
Chaitra  
Sukla  
Panchami  
4.76  
(VI.127.1)

Mrigasirsha/  
Ardra/  
Punarvasu  
(See Note  
X.5)

Sri Rama and Sita reunited. They boarded the Pushpaka Vimana with Vibhishna, Vanara chiefs and vanaras and it carried them swiftly by air. As they travelled in the sky, Sri Rama was pointing out to Sita the spots where important events occurred. As desired by Sita they alighted in Kishkinda and collected the woman-folk of vanaras. In the evening they reached the ashram of Bharadwaja. It was Sukla Panchami titi (VI.127.1). As requested by the sage, they all spent the night there. Sri Rama sent word in advance through Hanuman to Guha and Bharata that they would be arriving at Ayodhya next morning. When Hanuman informed Bharata in the night about the arrival of Sri Rama and party the next morning, the city of Ayodhya was filled with joy. Bharata ordered for preparations over night to give a fitting reception to Sri Rama and party. **NOTE:** The Panchami titi in our chart tallies with that given by Valmiki in VI 127.1

|           |             |           |
|-----------|-------------|-----------|
| 116118    | Viswavaha   | Punarvasu |
| 8.2.4395  | Chaitra     | Pushya    |
| Wednesday | Sukla       |           |
|           | Sashti 5.78 |           |

Sri Rama and Sita with Sri Lakshmana reached Nandigramma in the morning. They all met their brothers and mothers. Quick arrangements were made for the Coronation. **SRI RAMA WAS CROWNED KING OF AYODHYA**, when the Nakshatra Pushya was ruling and at Vijaya Muhurta, which is a favourite Muhurta of Sri Rama Gods blew their trumpets. Heaps of flowers were showered from the Heavens. Sri Bharata's penance ended and his heart was filled with joy.

Receiving a pearl necklace from Sri Rama, Sita presented it to Hanuman, as a token of gratitude to his service.

Sri Rama lived happily with Sita and ruled the country for many many ears. This **RAMA RAJYA** is still spoken as most ideal.

Those who read or listen to this diary of Sri Rama will be saved from sin and sorrow and will enjoy all the good things of life.

## NOTE X.1

### FIXATION OF THE DAY WHEN SURPANAKA CHANCED TO VISIT SRI RAMA'S HERMITAGE

स रामः पर्णशालायामासीनस्सह सीतया ।

विराज महाबाहूश्चित्रया चन्द्रमा इव ॥

"When long-armed Rama was sitting with Sita in their hermitage, he was shining like the Moon with Chitra star".

Thus Valmiki describes the day on which Surpanaka chanced to visit the hermitage of Sri Rama. This is a most important day, as it was a turning point in Ramayana. At the first reading it may appear that चित्रया चन्द्रमा इव is used as a simple simile to compare Sri Rama to Moon and Sita to Chitra constellation.

But the author felt that there may be something more than this, that Valmiki wants his posterity to understand by this simile, which may be flexible enough for some seekers to trigger new insights and to see more in it than others who do not. So a probe was made to check up whether it could be Chitra Nakshatra ruling on that day, so that it could mean also that as the Moon was shining with Chitra nakshatra on that day, Sri Rama was shining. The probe led to the illumination that, that day did have Chitra as the ruling nakshatra.

The calculation is reproduced hereunder.

|  |              |                  |
|--|--------------|------------------|
| Julian Day on the 31st January,                          | 4369 B.C. .. | 115815           |
| Julian Day on the 11th February,                         | 4433 B.C. .. | 102311           |
| Difference in days                                       |              | 13504            |
| Motion of Moon in 13504 days @ $13^{\circ}.1764$ per day |              | $94^{\circ}.11$  |
| Longitude of Moon on the 11th Feb. 4433 B.C...           |              | $84^{\circ}.07$  |
| Adding the above   |              | $178^{\circ}.18$ |

The segment of Chitra constellation falls between  $173^{\circ}$  to  $186^{\circ}.40$ . So it was Chitra nakshatra ruling on the 31st January 4396 B.C. By this wonderful process of resuming the thread left loose by Valmiki earlier, we find that the missing link buried deep is brought to the surface. This date fits in very well to account for the developments charted by us in Rama's Diary. Three weeks later i.e., on the 20th February, 4396 B.C., the 38th birthday of Sri Rama siderealy, Sita was abducted by Revana.

Thus Valmiki, in his own favourite method of recording hometruths and disseminating vital information in a captivating style, has not let this occasion also pass without bringing in a simile, self illustrative and intimately connected with this important context. Herein he refers to the conjunction of the planet Moon with the constellation Chitra, not only to communicate to his readers the complexional beauty and personal charm of Sri Rama but also the nakshatra ruling on that day.

## NOTE X.2

### FIXATION OF THE LAST DAY FOR VANARAS TO RETURN AFTER SEARCH FOR SITA

वयमाश्वयुजे मासि कालसंख्याव्यविस्थिताः ।

प्रस्यिताः सोऽपि चातीताः किमतः कार्यमुत्तरम् ॥ V 5322

"Further, we all set out with the time limit as that date when Moon gets to the constellation Aswini in the month. That date is crossed. What to do next?"

Thus Angada spoke to the Vanaras after they came out of the cave of the Tapasvini and when he realised that the time limit fixed by Sugriva had already passed and yet Sita was not located. We have to understand from the words आश्वयुजे मासि कालसंख्याव्यविस्थिताः

that the last date fixed by Sugriva was when the Moon reached the constellation Aswini in the month. This means that it was the day when Aswini nakshatra occurred in the month.

Let us now calculate the day when Aswini nakshatra occurred in the month.

Julian Day on the 12th December, 4396 B.C. ... 116130

Julian Day on the 11th February, 4433 B.C. ... 102311

Difference ... 13819

Motion of Moon in 13819 days at  $13^{\circ}.1764$  per day...  $284^{\circ}.09$

Longitude of Moon on the 11th Feb. 4433 B.C.  $84^{\circ}.07$

Adding  $8^{\circ}.16$

The segment of Aswini is  $0^{\circ}.00$  to  $13^{\circ}.33$ .

So the constellation Aswini occurred on the 12th December, 4369 B.C.



### NOTE X-3

#### FIXATION OF THE DAY ON WHICH SITA WAS CARRIED AWAY.

वर्तते दशमो मासो द्वौ तु शेषौ प्लवङ्गम ।

रावणेन नृशंसेन समयोः यः कृतो मम ॥

IV. 37.8

"O Vanara! Ten months out of twelve-months term allotted to me by the wicked Ravana have rolled away with two more months remaining".

Thus spoke Sita to Hanuman when they met at Ashok Vana on the 20th December, 4369 B.C., the Julian Day being 116138. This happened ten months after she was carried away by Ravana. It is evident that on the 20th February, 4396 B.C., she was carried away. This date tallies well with our chart. It is interesting to note that the day on which Sita was carried away, happens to be the 38th birth day of Sri Rama.

Further three weeks earlier, On the 31st January, 4396 B.C. Surpanaka chanced to meet Sri Rama at his hermitage.

This gives a good word-picture of the days taken for the subsequent developments since she met Sri Rama.

### NOTE X-4

#### FIXATION OF THE DAY ON WHICH ANGADA DEPUTED VANARAS TO SEARCH FOR SITA

In IV.0.69 Angada orders the vanaras to return before a month expires in search of Sita. "MAASE POORNE NIVARTADHWAM" As we discussed earlier, the last day to return after the search for Sita was the day when Aswini constellation was ruling i.e., Thursday, the 12th December, 4396 B.C. If we deduct one month we get Saturday, the 12th November, 4396 B.C.

Thus the day on which Angada deputed the vanaras to search for Sita gets fixed.

## NOTE X-5

### FIXATION OF NAKSHATRA ON THE DAY ON WHICH SRI RAMA COMPLETED HIS EXILE

In II.15.3, Valmiki has given directly the star as Pushya on the day of Sri Rama's departure on exile. The titi, Chaitra Sukla Dasami had set in when he actually left Ayodhya by noon. He went on exile the next day of his 25th birthday. We have also seen that it was Sunday, the 16th February, 4409 B.C.

In VI.127.1, Valmiki has said that on his way back to Ayodhya, Sri Rama and party reached Bharadwaja Ashram on the day when Sukla Panchami titi was ruling. This titi tallies well with our chart, thereby confirming that all our computations are correct. It was Tuesday, the 7th February, 4395 B.C.

By the phrase 'Poorne chaturdase varshe' in VI.127.1, Valmiki has declared that fourteen years of exile got technically completed on the day when he reached Bharadwaja Ashram on the return journey. In VI.128.24, Bharadwaja requested Sri Rama to spend that night in his ashram and proceed to Ayodhya next day. In VI.129.56, Hanuman clarifies that on the next day the Nakshatra Pushya would be ruling, when he was speaking to Bharata on 7.2.4395 B.C. This makes it very clear that Punarvasu was ruling on the day Sri Rama reached Bharadwaja ashram. Recalling, Sri Rama went on exile on a Chaitra Pushya star and completed it on a Chaitra Punarvasu star after full fourteen years, reckoned by nakshatra. Sri Rama went on exile on Sukla Dasami titi and completed fourteen years on Sukla Panchami titi. By this Valmiki has conveyed to his posterity that sidereal system was being practised during that age for reckoning the civilian periods, though titis were being followed for Punya Kalam, Rituals, Ceremonies etc. This is an important factor for us when we wish to fix the days of important events.

Valmiki has given the titis and nakshatras of various events, in his text in a punctuated pattern. We have seen that so far all these are tallying very well with our calculations. Such coincidences are highlighted in our chart at every instance. Wherever Valmiki has indicated the titis and nakshatras indirectly, the author has discussed them and given a separate note at the end of the Chapter. They all

tally. This confirms that the method adopted by the author in fixing the titis and nakshatras are correct, as so far proved. The method is very simple. It is by the rule of three. The Birth Day of Sri Rama, Sunday, the 11th February, 4433 B.C., (Julian Day 102311) is treated as the key day or reference day for calculating the titis and nakshatras, since it is a confirmed date in all respects and is closest to the events in Ramayana. But in these, the corrections required due to solar and lunar anomalies are not taken into account. Though all our calculations have so far tallied, they may not in a few cases. One such instance is the nakshatra and not the tithi on the day when Sri Rama reached Bharadwaja Ashram on the completion of his exile. As per our calculations the nakshatra is Mrigasirsha. But it should be Punarvasu.

Here one fact has to be recollected. Sri Rama is born in karkataka lagna when Punarvasu was ruling. On the same day, Sri Bharata is born in Meena Lagna when Pushya was ruling. Next day Sri Lakshmana and Sri Satrugna were born in the same karkataka lagna as Sri Rama, when Ashlesha was ruling. Thus within 26 hours, three Nakshatras were ruling, Pushya sandwiched between Punarvasu and Aslesha.

| Punarvasu-<br>Kataka Rasi | Pushya<br>Sunrise | Aslesha-<br>Kataka Rasi |
|---------------------------|-------------------|-------------------------|
| 10.48 A.M.                | 25 hrs,<br>12 min | 12 Noon<br>next day     |

Occurrence of three titis in a day is indicated in Valmiki Ramayana. In fact Dasaratha commenced his Putrakameshti on that auspicious day when three titis were ruling.

ततः काले बहुतिथे कस्मिंश्चित् सुमानोहरे ।

वसन्ते समनुष्ठाप्ते राज्ञो यष्टं मनोऽभवत् ॥

I. 12.1

"Just after the setting in of the lovely vasanta season on a day ruled by many titis, the king got the idea of performing yagna".

Here the mention of the word बहुतिथे 'BAHUTITHE' should mean three titis. Occurrence of more than three titis in a day is not conceivable. Even three titis coming on the same day is very rare. This could occur between sunrises or with one sunrise in between. Such a day appears to have been considered as most auspicious for religious purposes, rituals etc.

The most important day in Valmiki Ramayana is the day on which Sri Rama has taken his Avatara, to kill devilish Ravana. On this day three nakshatras were ruling to underline the divine aspects. Another important day in Ramayana is the day on which Sri Rama completed his exile period and returned to Ayodhya after fulfilling the purpose of his Avatar. Valmiki has stated that it was punarvasu when he reached Bharadwaja Ashram and Pushya next day when he returned to Ayodhya. Thus Punarvasu is sandwiched between Mrigasirsha and Pushya, between 6 A.M. and 11 A.M. next day.

|                         |           |                                  |
|-------------------------|-----------|----------------------------------|
| Mrigasirsha-<br>Sunrise | Punarvasu | Pushya-<br>Sunrise               |
| 6 A.M.                  |           | 11 A.M.<br>next day<br>(Maximum) |

As per our calculations it was Mrigasirsha when Sri Rama reached Bharadwaja Ashram. So we have to correct the nakshatra on that day as Mrigasirsha/Punarvasu.

Thus when Sri Rama returned to Ayodhya next morning, Wednesday, the 8th February, 4395 B.C., Pushya should have set in before noon, as per the words of Hanuman.

AT NOON, ON WEDNESDAY, THE 8TH FEBRUARY, 4395 B.C., IN PUSHYA NAKSHATRA AND IN VIJAYA MUGURTA, WHICH IS THE FAVOURITE MUGURTA OF SRI RAMA, THE PATTABISHEKA OF SRI RAMA WAS CELEBRATED IN A FITTING MANNER.

Subham.

## DATE-WAR EVENTS IN VALMIKI RAMAYANA

|  |                                    |
|--|------------------------------------|
| Sri Rama's Birth   | .. 11th February, 4433 B.C.        |
| Sri Rama's sudden departure with<br>Sage Viswamitra  | .. 6.2.4421 B.C.                   |
| Sri Rama's Wedding   | .. 4.3.4421 B.C.                   |
| Sri Rama's stay in Ayodhya after his<br>marriage   | .. 5.3.4421 to<br>16.2.4409 B.C.   |
| Sri Rama's sudden departure on exile   | .. 16.2.4409 B.C.                  |
| Sri Rama's stay at Chitrakuta  | .. 22.2.4409 to<br>22.3.4409 B.C.  |
| Sri Rama's stay in the company of<br>the rishis by rotation till<br>the end of the 10th year | .. 26.3.4409 to<br>23.2.4399 B.C.  |
| Sri Rama's stay at Panchavati  | .. 26.2.4399 to 20.2.4396<br>B.C.  |
| From Ravana's abduction of Sita<br>till the day Sugriva sent<br>Vanaras in search for her    | .. 20.2.4396 to<br>12.11.4396 B.C. |
| Last day fixed for the search of Sita<br>and return.   | .. 12.12.4396 B.C.                 |
| Hanuman's visit to Lanka and return  | .. 19.12. to 22.12.4396 B.C.       |
| Sri Rama's sudden departure to Lanka<br>with army of vanaras                                 | .. 23.12.4396 B.C.                 |
| March time till Sri Rama reached the<br>sea shore  | .. 23.12.4396 to<br>9.1.4395 B.C.  |
| Darbasayana of Sri Rama  | .. 10.1. to 13.1.4395 B.C.         |
| Construction of causeway   | .. 13.1. to 18.1.4395 B.C.         |
| Rama-Ravana battle   | .. 19.1.4395 to 5.2.4395 B.C.      |
| Vibhishna Pattabisheka   | .. 6.2.4395 B.C.                   |
| Sri Rama's arrival at Bharadwaja<br>ashram   | .. 7.2.4395 B.C.                   |
| Sri Rama's return to Ayodhya and<br>Pattabisheka   | .. 8.2.4395 B.C.                   |



# ANNEXURES

## ANNEXURE 1

### PERT CHART OF ASHWAMEDHI AND PUTRAKAMESHTI YAGNAS OF DASARATHA AND JANANAS OF SRI RAMA AND BROTHERS.

| Julian Day        | Days | Code    | Activities   |
|-------------------|------|---------|--|
| 101942            | ½    | 0 - 1   | On an auspicious date after the commencement of Vasanta Ruthu, Dasaratha requests Sage Vasishta, Preceptor of Ikshvaku family to conduct the yagnas. |
|                   | ½    | 1 - 2   | Vashishta gives detailed instructions to all organisers and skilled personnel.   |
| 101943            | 28   | 2 - 3   | Arrangements and preparations are in full swing.   |
|                   | ¼    | 3 - 4   | Arrangements get completed.  |
|                   | ¼    | 4 - 5   | Sacrifice Horse arrives at site.   |
|                   | ¼    | 5 - 6   | Vasishta advises Dasaratha to proceed to Yagnasala.  |
| 101972            | ½    | 6 - 7   | Dasaratha proceeds to Yagnasala.   |
|                   | b    | 7 - 8   | Yagna commences and preliminary ceremonies.  |
| 101972<br>+ b     | 1    | 8 - 9   | Queen Kausalya kills Sacrifice Horse and stays with it for a night.  |
|                   | .    | 9 - 10  | Ashwameda Yagna proper.  |
| 101975            | 1    | 10 - 11 | Presentation of gifts to Brahmins and others.  |
|                   | c    | 11 - 12 | Putrakameshti commences.   |
| 101976<br>+ b + c | ¼    | 12 - 13 | Prajapati Nara appears at the Agni Kunda and hands over direct to Dasaratha the Divine Payasam.  |

| Julian Day            | Days          | Code    | Activities   |
|-----------------------|---------------|---------|--|
| 101977<br>+ b + c     | $\frac{1}{4}$ | 13 - 14 | Dasaratha himself gives 50% of Payasam to Queen Kausalya first separately.                                       |
|                       | $\frac{1}{4}$ | 14 - 15 | Dasaratha himself gives half of the balance i.e., (25%) of the Payasam to Queen Sumatra separately.              |
|                       | $\frac{1}{4}$ | 15 - 16 | Dasaratha himself gives half of the balance i.e., (12½%) of the Payasam to Queen Kaikeyi separately.             |
|                       | $\frac{1}{4}$ | 16 - 17 | Dasaratha himself gives the entire balance of 12½% payasam to Queen Sumatra again separately.                    |
|                       | $\frac{1}{2}$ | 17 - 18 | Dasaratha gives ceremonioussend off to VVIPs. VIPs and other guests after rewarding them with suitable gifts.    |
| 101978<br>+ b + c     | $\frac{1}{2}$ | 18 - 19 | Dasaratha returns to Ayodhya.  |
|                       | $\frac{1}{4}$ | 19 - 20 | Dasaratha rejoices when he comes to know about the pregnancy of the queens.                                      |
| 101979<br>+ b + c     | d             | 20 - 21 | Dasaratha awaits the happy births of children.   |
| 102311<br>+ b + c + d | $\frac{1}{4}$ | 21 - 22 | Kausalya gives birth to Sri Rama.  |
|                       | $\frac{1}{4}$ | 22-23   | Kaikeyi gives birth to Sri Baratha.  |
| 102312<br>+ b + c + d | $\frac{1}{2}$ | 23 - 24 | Sumatra gives birth to Sri Lakshmana and Sri Satrugna  |
| 102322<br>+ b + c + d | 11            | 24 - 25 | Vasishta performs Namakarana function of all children and Dasaratha lives happily awaiting further happy events. |

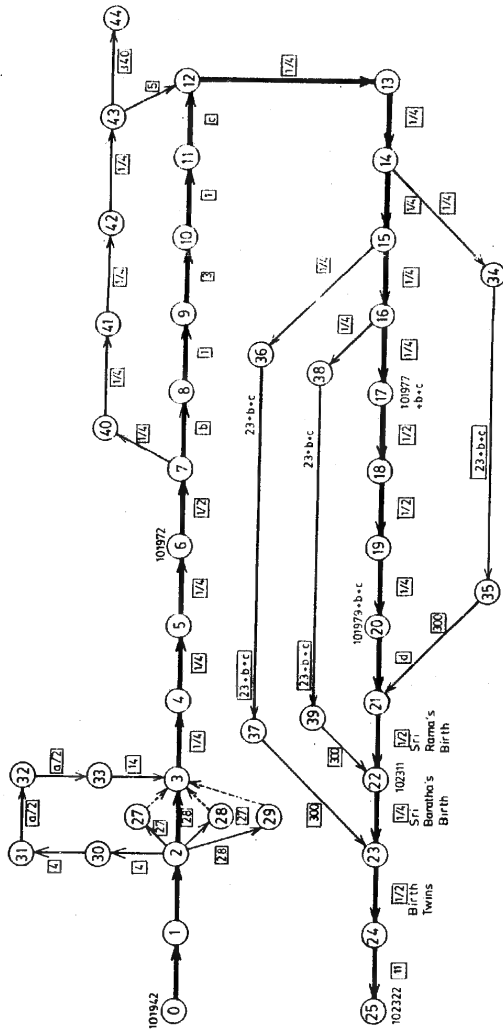
| Julian Day | Days          | Code    | Activities   |
|------------|---------------|---------|--|
| 101942     | 27            | 2 - 27  | Workers of various disciplines collect materials required for the yagna and transport them to site.  |
|            | 27            | 2 - 28  | Workers collect bricks and transport them to site.   |
|            | 28            | 2 - 29  | As per instructions of Vasishtha Sumantra deputed special emissaries to invite VIPs in various places of the kingdom and all the VIPs arrive |
| 101946     | 4             | 2 - 30  | Sumantra himself goes to Mithula to invite Janaka.   |
| 101950     | 4             | 30 - 31 | Sumantra himself escorts Janaka to Ayodhya.  |
|            | a/2           | 31 - 32 | Sumantra himself goes to invite Kasyapa Raja.  |
|            | a/2           | 32 - 33 | Sumantra himself escorts Kasyapa Raja to Ayodhya.  |
|            | 14            | 33 - 3  | Sumandra himself goes to Kekaya to invite the king and escorts him to Ayodhya.   |
|            | ¼             | 14 - 34 | Queen Kausalya takes her share of payasam.   |
|            | 23 +<br>b + c | 34 - 35 | Kausalya conceives soon.   |
|            | 300           | 35 - 21 | Kausalya develops full pregnancy and attains labour pains.   |
|            |               |         |  |



| Julian Day | Days          | Code    | Activities  |
|------------|---------------|---------|---|
|            | $\frac{1}{4}$ | 15 - 36 | Sumatra takes her share of Payasam.   |
|            | 23 +<br>b + c | 36 - 37 | Sumatra conceives soon.   |
|            | 300           | 37 - 23 | Sumatra develops full pregnancy and attains labour pains.   |
|            | $\frac{1}{4}$ | 16 - 38 | Kaikeyi takes her share of Payasam.   |
|            | 23 +<br>b + c | 38 - 39 | Kaikeyi conceives soon.   |
|            | 300           | 39 - 22 | Kaikeyi develops full pregnancy and attains labour pains.   |
|            | $\frac{1}{4}$ | 7 - 40  | Devas, Suras, Gandharvas etc., witness yagna of Dasaratha and confer.   |
|            | $\frac{1}{4}$ | 40 - 41 | They all proceed to Brahma and represent their grievances regarding the atrocities of Ravana.                                     |
|            | $\frac{1}{4}$ | 41 - 42 | Appearance of Vishnu.   |
|            | $\frac{1}{4}$ | 42 - 43 | Lord Vishnu listens to their grievances and proclaims his intention to take Avatar as Sri Rama to annihilate Ravana and his race. |
|            | 5             | 43 - 12 | Brahma deposes his Nara to appear at the Agni Kunda and hand over the Divine Payasam to Dasaratha.                                |
|            | 340           | 43 - 44 | Brahma advises Devas to produce powerful vanara heroes through the vanara womenfolk.  |

# PERT CHART OF ASWAMEDHI AND PUTRAKAMESHTI YAGNAS OF DASARATHA AND JANANAS OF SRI RAMA AND BROTHERS

ANNEXURE-2



**LEGEND**

- Critical path
- Figures with in box indicate Maximum allowable period in days
- Six digit figures indicate the Julian day

# ANNEXURE 4.

## Days from 1st January to the end of the Year

| Ordinary year | Date | Days | Ordinary year | Date | Days |
|---------------|------|------|---------------|------|------|
| January       | 1    | 1    | February      | 1    | 32   |
|               | 2    | 2    |               | 2    | 33   |
|               | 3    | 3    |               | 3    | 34   |
|               | 4    | 4    |               | 4    | 35   |
|               | 5    | 5    |               | 5    | 36   |
|               | 6    | 6    |               | 6    | 37   |
|               | 7    | 7    |               | 7    | 38   |
|               | 8    | 8    |               | 8    | 39   |
|               | 9    | 9    |               | 9    | 40   |
|               | 10   | 10   |               | 10   | 41   |
|               | 11   | 11   |               | 11   | 42   |
|               | 12   | 12   |               | 12   | 43   |
|               | 13   | 13   |               | 13   | 44   |
|               | 14   | 14   |               | 14   | 45   |
|               | 15   | 15   |               | 15   | 46   |
|               | 16   | 16   |               | 16   | 47   |
|               | 17   | 17   |               | 17   | 48   |
|               | 18   | 18   |               | 18   | 49   |
|               | 19   | 19   |               | 19   | 50   |
|               | 20   | 20   |               | 20   | 51   |
|               | 21   | 21   |               | 21   | 52   |
|               | 22   | 22   |               | 22   | 53   |
|               | 23   | 23   |               | 23   | 54   |
|               | 24   | 24   |               | 24   | 55   |
|               | 25   | 25   |               | 25   | 56   |
|               | 26   | 26   |               | 26   | 57   |
|               | 27   | 27   |               | 27   | 58   |
|               | 28   | 28   |               | 28   | 59   |
|               | 29   | 29   |               |      |      |
|               | 30   | 30   |               |      |      |
|               | 31   | 31   |               |      |      |

|       |    |    |     |    |     |
|-------|----|----|-----|----|-----|
| March | 1  | 60 |     | 8  | 98  |
|       | 2  | 61 |     | 9  | 99  |
|       | 3  | 62 |     | 10 | 100 |
|       | 4  | 63 |     | 11 | 101 |
|       | 5  | 64 |     | 12 | 102 |
|       | 6  | 65 |     | 13 | 103 |
|       | 7  | 66 |     | 14 | 104 |
|       | 8  | 67 |     | 15 | 105 |
|       | 9  | 68 |     | 16 | 106 |
|       | 10 | 69 |     | 17 | 107 |
|       | 11 | 70 |     | 18 | 108 |
|       | 12 | 71 |     | 19 | 109 |
|       | 13 | 72 |     | 20 | 110 |
|       | 14 | 73 |     | 21 | 111 |
|       | 15 | 74 |     | 22 | 112 |
|       | 16 | 75 |     | 23 | 113 |
|       | 17 | 76 |     | 24 | 114 |
|       | 18 | 77 |     | 25 | 115 |
|       | 19 | 78 |     | 26 | 116 |
|       | 20 | 79 |     | 27 | 117 |
|       | 21 | 80 |     | 28 | 118 |
|       | 22 | 81 |     | 29 | 119 |
|       | 23 | 82 |     | 30 | 120 |
|       | 24 | 83 | May | 1  | 121 |
|       | 25 | 84 |     | 2  | 122 |
|       | 26 | 85 |     | 3  | 123 |
|       | 27 | 86 |     | 4  | 124 |
|       | 28 | 87 |     | 5  | 125 |
|       | 29 | 88 |     | 6  | 126 |
|       | 30 | 89 |     | 7  | 127 |
|       | 31 | 90 |     | 8  | 128 |
| April | 1  | 91 |     | 9  | 129 |
|       | 2  | 92 |     | 10 | 130 |
|       | 3  | 93 |     | 11 | 131 |
|       | 4  | 94 |     | 12 | 132 |
|       | 5  | 95 |     | 13 | 133 |
|       | 6  | 96 |     | 14 | 134 |
|       | 7  | 97 |     | 15 | 135 |

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|      | 16 | 136 |      | 23 | 174 |
|      | 17 | 137 |      | 24 | 175 |
|      | 18 | 138 |      | 25 | 176 |
|      | 19 | 139 |      | 26 | 177 |
|      | 20 | 140 |      | 27 | 178 |
|      | 21 | 141 |      | 28 | 179 |
|      | 22 | 142 |      | 29 | 180 |
|      | 23 | 143 |      | 30 | 181 |
|      | 24 | 144 | July | 1  | 182 |
|      | 25 | 145 |      | 2  | 183 |
|      | 26 | 146 |      | 3  | 184 |
|      | 27 | 147 |      | 4  | 185 |
|      | 28 | 148 |      | 5  | 186 |
|      | 29 | 149 |      | 6  | 187 |
|      | 30 | 150 |      | 7  | 188 |
|      | 31 | 151 |      | 8  | 189 |
| June | 1  | 152 |      | 9  | 190 |
|      | 2  | 153 |      | 10 | 191 |
|      | 3  | 154 |      | 11 | 192 |
|      | 4  | 155 |      | 12 | 193 |
|      | 5  | 156 |      | 13 | 194 |
|      | 6  | 157 |      | 14 | 195 |
|      | 7  | 158 |      | 15 | 196 |
|      | 8  | 159 |      | 16 | 197 |
|      | 9  | 160 |      | 17 | 198 |
|      | 10 | 161 |      | 18 | 199 |
|      | 11 | 162 |      | 19 | 200 |
|      | 12 | 163 |      | 20 | 201 |
|      | 13 | 164 |      | 21 | 202 |
|      | 14 | 165 |      | 22 | 203 |
|      | 15 | 166 |      | 23 | 204 |
|      | 16 | 167 |      | 24 | 205 |
|      | 17 | 168 |      | 25 | 206 |
|      | 18 | 169 |      | 26 | 207 |
|      | 19 | 170 |      | 27 | 208 |
|      | 20 | 171 |      | 28 | 209 |
|      | 21 | 172 |      | 29 | 210 |
|      | 22 | 173 |      | 30 | 211 |
|      |    |     |      | 31 | 212 |

August

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September

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September



# ANNEXURE 5

## NAKSHATRAS, THEIR OTHER EQUIVALENTS AND DEGREES:

| No. | English             | Tamil        | Sanskrit             | Deg. up to |
|-----|---------------------|--------------|----------------------|------------|
|     |                     |              |                      | °          |
| 1.  | Beta Arietis        | Aswini       | Aswini               | 13 20      |
| 2.  | 35 Arietis          | Bharani      | Bharani              | 26 40      |
| 3.  | Eta Tauri           | Kirutikai    | Kritika              | 40 00      |
| 4.  | Aldebaran           | Rohini       | Rohini               | 53 20      |
| 5.  | Lambda Orionis      | Mrigasirsham | Mrigasirsha          | 66 40      |
| 6.  | Alpha Orionis       | Tiruvadirai  | Ardra                | 80 00      |
| 7.  | Beta Geminorum      | Punarpusam   | Punarvasu            | 93 20      |
| 8.  | Delta Caceri        | Pusam        | Pushya               | 106 40     |
| 9.  | Alpha Hydroe        | Ayilyam      | Ashlesha             | 120 00     |
| 10. | Regulus             | Magam        | Makha                | 133 20     |
| 11. | Delta Leonis        | Pooram       | Purva Phalguni       | 146 40     |
| 12. | Beta Leonis         | Uttiram      | Utara Phalguni       | 160 00     |
| 13. | Delta Gorvi         | Astham       | Hasta                | 173 20     |
| 14. | Spica Virgins       | Chitirai     | Chitra               | 186 40     |
| 15. | Arcturus            | Suwathi      | Swati                | 200 00     |
| 16. | Alpha Libroe        | Visakam      | Vishaka              | 213 20     |
| 17. | Delta Scorpio       | Anusham      | Anuradha             | 226 40     |
| 18. | Antares             | Kettai       | Jyeshtha             | 240 00     |
| 19. | Lambda Scorpii      | Moolam       | Mula                 | 253 20     |
| 20. | Delta Sagittari     | Pooradam     | Purva Ashada         | 266 40     |
| 21. | Sigma Sagittari     | Uthiradam    | Uttara Ashada        | 280 00     |
| 22. | Alpha Aquiloe       | Thiruvonam   | Shravana             | 293 20     |
| 23. | Beta Delphinum      | Avittam      | Dhanishta            | 306 40     |
| 24. | Lambda<br>Acquarius | Sadayam      | Satha Bishag         | 320 00     |
| 25. | Alpha Pegasi        | Pooratati    | Purva<br>Bhadrapada  | 333 20     |
| 26. | Gama Pegasi         | Uthiratati   | Uttara<br>Bhadrapada | 346 40     |
| 27. | Zeta Piscum         | Revati       | Revati               | 360 00     |



## THE ZODIAC AND THE PLANETS

Below are given the names of the twelve signs both in the Indian and Western systems and their symbols.

### TABLE OF SIGNS

| INDIAN SYSTEM   | WESTERN SYSTEM    | SYMBOL |
|-----------------|-------------------|--------|
| Mesha .. ..     | Aries .. ..       | ♈      |
| Vrishabha .. .. | Taurus .. ..      | ♉      |
| Mithuna .. ..   | Gemeni .. ..      | ♊      |
| Kataka .. ..    | Cancer .. ..      | ♋      |
| Simha .. ..     | Leo .. ..         | ♌      |
| Kanya .. ..     | Virgo .. ..       | ♍      |
| Tula .. ..      | Libra .. ..       | ♎      |
| Vrischika .. .. | Scorpio .. ..     | ♏      |
| Dhanu .. ..     | Sagittarius .. .. | ♐      |
| Makar .. ..     | Capricorn .. ..   | ♑      |
| Kumbha .. ..    | Acquarms .. ..    | ♒      |
| Meena .. ..     | Pisces .. ..      | ♓      |

The Zodiac is diagrammatically represented in the following manner in the Indian and Western systems. We have chosen the most convenient forms only.

### DIAGRAMMATIC REPRESENTATION

|              |                  |                |              |
|--------------|------------------|----------------|--------------|
| 12<br>MEENA  | 1<br>MESHA       | 2<br>VRISHABHA | 3<br>MITHUNA |
| 11<br>KUMBHA | INDIAN<br>SYSTEM |                | 4<br>KATAKA  |
| 10<br>MAKAR  |                  |                | 5<br>SIMHA   |
| 9<br>DHANU   | 8<br>VRISCHIKA   | 7<br>THULA     | 6<br>KANYA   |

